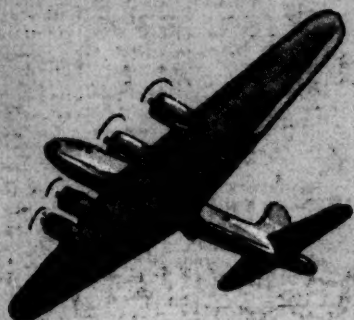


# MILITARY REVIEW

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**COMMAND AND GENERAL STAFF SCHOOL**

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REVIEW



*MONTHLY REVIEW OF MILITARY LITERATURE*



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January 1944



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BRIGADIER GENERAL J. A. DOE	<i>Notes on Jungle Warfare</i>
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LIEUTENANT COLONEL L. H. NASON	<i>Reconnaissance by Medium Armor—Mateur, May 1943</i>
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CAPTAIN F. J. CROSSETT	<i>Essentials of Motor Maintenance in the Field</i>
CAPTAIN R. D. ORR	<i>Operations in the Aleutians</i>

# Contents

	<i>Page</i>
NOTES ON JUNGLE WARFARE .....	5
TARGET INFORMATION .....	10
USASOS SWPA .....	13
RIVER LINE OPERATIONS .....	15
A CHECK LIST FOR SUMMARY COURTS .....	20
OPERATIONS IN THE ALEUTIANS .....	21
THE RUSSIAN ARMY .....	24
THE ASSAULT OF FORTIFIED POSITIONS .....	28
THE AIR TRANSPORT COMMAND .....	31
THE PROOF OF THE PUDDING .....	35
TACTICAL EMPLOYMENT OF ANTIAIRCRAFT SEARCHLIGHTS .....	38
THE STAFF IN MODERN WAR .....	42
ESSENTIALS OF MOTOR MAINTENANCE IN THE FIELD .....	44
TACTICAL STUDY OF TERRAIN .....	48
"PASS THE AMMUNITION" .....	50
AIR DISCIPLINE .....	53
RECONNAISSANCE BY MEDIUM ARMOR—MATEUR, MAY 1943 .....	55
TEACHING MILITARY SUBJECTS .....	58
MORALE .....	60
MILITARY NOTES AROUND THE WORLD .....	61
FOREIGN MILITARY DIGESTS .....	65
<i>Cooperation of All Arms in Attack</i> .....	65
<i>Some Factors Affecting Military Morale</i> .....	66
<i>Tempo of Tank Attack</i> .....	68
<i>The Commanding Officer—The Heart of the Defense</i> .....	70
<i>Artillery Counter-Preparation</i> .....	72
<i>Tank Tactics</i> .....	73
<i>Lessons From Experience in Aerial Combat</i> .....	75
<i>The Work of the Rear</i> .....	77
<i>Establishing the Bridgehead at Sabsk</i> .....	78
<i>Attack from the Bridgehead at Sabsk</i> .....	81
<i>Defense of the Forward Edge</i> .....	84
<i>Photographic Reconnaissance Unit of the British Coastal Command</i> .....	85
<i>Look Out, We're Surrounded!</i> .....	87
<i>Point-Blank Fire in Forests</i> .....	88
<i>Men of the Air Reconnaissance</i> .....	89
<i>Artillery Accompaniment of Mobile Elements</i> .....	90
<i>The Flying Fortresses</i> .....	91
<i>Fighting for Cities in Offensive and Defensive Action</i> .....	92
<i>Snipers in Offensive Combat</i> .....	93
<i>Superiority of Leadership</i> .....	95

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# Notes on Jungle Warfare

BRIGADIER GENERAL JENS A. DOE, 41st Division

*These notes on jungle warfare are based on personal experience, observation, and conversations with American and Australian officers who participated in various New Guinea operations. Subsequent operations may cause some modification of the ideas herein expressed.—THE AUTHOR.*

## GENERAL

a. In the Southwest Pacific supply is principally by sea, and hence seaports are of outstanding importance. Seaports and the airfields which protect them become the most important military objectives. Since these are in the coastal areas most of the fighting will be adjacent thereto and hence usually in coastal lowlands. Steep mountain ranges which adjoin the lowlands are incidental operation areas even though they are certain to be traversed during a campaign. The force defending the approaches to a seaport will have been able to transport normal and heavy equipment. The conclusion follows that special light jungle equipment will not suffice in decisive actions; heavy equipment, including field artillery, can and must be provided for the greater part of operations.

b. The entire area will be covered by jungle varying from coastal tangle broken by numerous patches of kunai grass to heavy forest jungle of the mountains. The various types of forest or jungle and the mountains can, however, be combined with respect to two common factors: the cover they afford to armies, and the check they impose on maneuvers.

Among the principal features encountered will be the following:

- (1) Deficiency in lines of communications. Special deficiency in transverse routes.
- (2) Close country, with high temperature and humidity, involving greater exertion on the part of troops than when involved in open terrain.
- (3) As a rule, limited population, sparsely settled, with scant local resources.
- (4) Varying climatic conditions at different elevations. These will be further varied by wet and dry seasons.
- (5) Tropical diseases, particularly malaria.

c. The principles of war and the combat methods of open warfare are applicable in the jungle. Visibility is reduced, concealment increased, affording greater opportunities for surprise in attack and defense. Formations are more compact, approaching those of night operations. Small columns are used habitually, almost to the point of actual combat, to maintain direction and for control. The compass is indispensable. Movement is reduced, tending to

stabilize and to limit objectives. In defense, distances and intervals between units are reduced.

d. Infantry is the general purpose and most important arm in the jungle. Infantry and only infantry provides the movement necessary for a decision. In hills and mountains infantry may be the sole ground arm. In such cases its lack of fire power must be compensated by air support, aggressiveness, and movement.

e. In the jungle, against entrenched or well supported infantry, fire power is just as important as in open warfare. Field artillery, infantry mortars, and aviation are required to provide necessary support. Due to the nature of the jungle, fire power may be required for a shorter distance; but infantry mortars alone will not suffice. The infantry-artillery team is the most powerful combination that can be devised for hard, jungle fighting. Due to the jungle itself, swamps and numerous streams of the lowlands, or steep grades of the hills and mountains, tank operation is restricted to the most limited areas. In certain areas, however, tank support may be decisive.

f. Air transport has revolutionized jungle warfare. Columns operating in difficult terrain may be adequately supplied by air transport alone, by dropping. If a strip can be made available, artillery support may be provided in areas hitherto only suitable for infantry. Ammunition and supplies can be brought up, and sick and wounded may be evacuated. Jungle-trained infantry, carrying all their arms, ammunition, and supplies on their backs, will operate alone and unsupported only in most difficult terrain, for short periods, on missions incidental to main operations.

g. In main operations field and antiaircraft artillery must be provided. The need for engineers is vastly increased. The medical service must be augmented and litter bearers, especially, increased in number. Special efforts must be made by supply services, often augmented by air transport. Radio communication is difficult or impossible, creating a great demand for wire service.

h. The assembly in an area, by water, air, or marching, is slower than in open warfare; operations from a base or assembly area are restricted, slower and limited in distance, indicating less need for motor transport.

i. With few modifications, the organization of the regimental combat team or the division is much the same for jungle warfare as for open warfare. When the situation requires, the usual procedure will be to reduce the amount of equipment and store that



which is unsuitable until required or until it can be brought up. Personnel released, such as antitank and cannon companies, will be used to handle other equipment and ammunition. Task forces can be organized also by the issue of lighter or special substitutive equipment for special operations.

#### MARCHES

a. Marches must be counted in hours or days, not in miles. The poor trail, heat, and humidity are always present. In the hills steep grades must be overcome, and on the coastal plains, trails deep in mud.

b. No rate of march can be prescribed. The footing will vary from beach track, slippery jungle trail, to waist deep swamps; from fairly level walking to hundreds of steps in chasms or the steepest of trails in the mountains. During the rainy season the head of a battalion may march on firm though slippery ground, and the tail of the battalion will march in ankle to hip-deep mud. In the hill country the trails follow the ridges. In the lowlands, the trails tend to concentrate near streams, follow the beaches, or connect the land islands in the swamps. At times troops may walk fifty minutes and rest ten, at other times walk ten and rest ten.

c. The normal march formation is column of files. Larger formations, therefore, usually march in separate columns on the same trail.

d. Men should be as lightly burdened as possible. Normally men will have to carry minimum fighting equipment and such items as are needed for health and comfort. Full use should be made of air, motor, water transport, and native carriers to bring up heavier equipment, ammunition, and impedimenta.

e. The length of each day's march also depends on the location of bivouac areas with a water supply and natural defensive strength.

f. The general speed of the advance is influenced by the speed of supply.

g. Night advances are usually only possible if the trail has been reconnoitered by patrols and is controlled by a forward detachment.

h. Troops moving off tracks cannot keep up, and find great difficulty in maintaining contact with troops on tracks.

i. Commanders march well forward in their units.

j. Airplanes may sometimes be used to guide patrols or marching columns.

#### HALTS

a. During march halts, the column secures itself by standing patrols.

b. Forces which halt for longer than a march rest secure themselves by means of a perimeter disposition which permits all-around defense.

c. On the march in hill country an all-around defensive bivouac is usually established astride the trail. The bivouac area should not be commanded by

nearby high ground. In flat jungle mutually supporting perimeters may be established on both sides of the trail.

d. The halt for the night is made two or three hours before darkness so troops may be deployed, dug in, sheltered, and fed before dark. Men should sleep off the ground on improvised platforms or in hammocks if possible, or on the poncho.

e. In hill country, streams will influence the location of the bivouac. In the lowlands the water table is close to the surface and water seeps may be quickly dug. All water must be chlorinated.

f. Rifle and weapons squads are disposed along the outer edge of the bivouac in circular or square formations. In the rifle squad the two or three-man fox hole is generally most suitable. The distance between squads depends on the visibility and may be as little as ten yards. No field of fire is cleared; short individual fire lanes are cleared by removing the most dense underbrush only, or by cutting lanes in kunai grass. Few trees need be cut. Inside the perimeter a greater amount of underbrush may be cut to provide freer circulation and field of fire.

g. In forces the size of a company or larger, support and reserve lines are similarly organized.

h. Sniper-observer teams are established on the ground and in trees.

#### SECURITY

a. *On the March.* (1) When the enemy is believed to be distant and natives are friendly, a small officer's patrol accompanied by friendly natives or constabulary may be sent several days march ahead of the column to reconnoiter.

(2) As combat becomes more imminent a fighting patrol of about a platoon precedes the column or force from an hour to half a day's march if the trail is unknown and side trails are to be explored. The patrol should be instructed as to whether or not it should maintain contact or fall back when the enemy is encountered.

(3) The marching column should cover itself with a small advance guard consisting of a point and support, and follow at about fifty yards. On trails which have been widened into jeep tracks the advance guard should be strengthened and distances increased.

(4) Flank patrols and flank guards will seldom be possible along a jungle track. They should be employed in moving through plantations, large villages, and open areas.

b. *At the Halt.* (1) Standing patrols should be posted to cover the approaches to a halted force. The day and night positions may not be used the same. If the halt is to be for more than a few hours, fox holes should be dug.

(2) In semi-open terrain, plantations, coconut groves, beach areas, and the like, a complete outpost may be required.

*c. In the Attack.* (1) After contact has been gained, the exact location, shape, and nature of the enemy organization must be secured by patrols. The organization and direction of reconnaissance is a command function.

(2) Close-range reconnaissance patrols should be small, consisting of two to four men. The two leading men move alternately, the second man covering the first to the limit of visibility, usually ten yards or less. Direction is maintained with the compass by the third man, who may also carry a sound power telephone. The rear point carries the reel of wire. The third man may at times come from battalion or regimental intelligence section. Close range patrols usually move crawling.

(3) Longer range reconnaissance patrols sent to locate the enemy flanks or rear more often consist of about twenty men to a platoon, and may include intelligence and aid men. They carry rations and may carry a sound power telephone. The usual formation is column of files, preceded by two scouts at the limit of visibility, normally ten to fifteen yards behind the leading scout. Distances, intervals, and formations are changed in accordance with visibility.

(4) Patrols sent out to investigate trails in proximity to the enemy are organized similarly.

(5) The patrol leader should preferably have an oil compass and should be able to maintain a circuitous course. Most of the basic training for scouting and patrolling in open country is applicable to jungle patrolling.

(6) After contact has been definitely established, coordinated fire action may cause enemy troops to disclose the nature and extent of the hostile disposition, permitting the selection of points of attack.

(7) When in close contact with the enemy it may be necessary to take vigorous fire action against hostile tree sniper-observers before patrols are sent out.

(8) The orientation of patrols may sometimes be assisted by pre-arranged rifle or mortar signals.

#### THE APPROACH MARCH

*a.* When the approximate position of the enemy has been determined, the advance to contact is made on a wider front. The formations used in open warfare are suitable, but distance and intervals are decreased in accordance with visibility. Scouts precede the formation at a distance of 15-20 yards with squads in column at about 10-15 yards distance and interval. The advance is by bounds to the scouts, the scouts moving out to the limit of visibility. Skirmish lines are not employed by the leading wave until contact has been made. In semi-open country, bounds are from terrain feature to terrain feature, usually the edges of woods or ridges, while the scouts explore the next feature to the front. When contact is expected, the battalion commander sets up the heavy mortars to cover the advance.

*b.* Hostile standing patrols are removed by the

envelopment of support squads or platoons against their flanks and rear; if necessary, supported by deployment and fire by the leading squads, and by the fire of mortars.

#### THE ATTACK

*a.* The enemy position must be accurately located, before the attack, by patrols and if need, by reconnaissance in force. An enemy position entirely in the jungle cannot be located from the air.

*b.* The enemy who waits in position will find it difficult or impossible to estimate the strength of the reconnoitering force and just how far away it has withdrawn from immediate contact.

*c.* Preparations for the attack must be protected. The track must be held in force to cover the base of fire and break up any attempted counteroffensive.

*d.* Based principally on the information obtained by ground reconnaissance, the commander will decide on the point and direction of attack. This should preferably be against the flank and rear, and in hill country, down hill if possible. If time is limited, or in mountainous tree jungle, it may be necessary to start an envelopment without complete reconnaissance. It may take several hours or days for the enveloping force to reach its assembly position, depending upon the terrain. A small enveloping force which places itself in rear of the enemy and astride the supply trail will frequently cause a hostile withdrawal in a few days. Such a force organizes a perimeter for all-around defense. It must carry extra rations and ammunition, including a large supply of hand grenades. It must expect to be repeatedly counterattacked by day and night. Normally, however, the enveloping force attacks from an assembly position with mortar and artillery support. It reports its progress periodically by radio or wire.

*e.* The enveloping force moves to its assembly position in one or more columns. Trail cutters must be changed frequently. On reaching the assembly position the attack is organized as in open warfare. Patrols must be sent forward to locate the hostile positions and cover the mortar and artillery observers. The formation is somewhat similar to that used in night attacks, with distances and intervals reduced. The intervals between skirmishes is about 2 or 3 yards, and supports and reserves follow close behind in squad columns.

*f.* Fire support is as essential in the jungle as in open warfare. Unsupported infantry cannot breach a defensive position without incurring heavy losses. The area to be breached must be pinpointed. Artillery and mortar observers operating together may have to approach within 30 yards, and usually observe from the prone position or from a fox hole. Infantry mortars should register before the artillery. Artillery passes from registration right into fire for effect. Initial registration is made with smoke shell or by sound and nearly always adjusted by creeping.



Shortly before the termination of the artillery bombardment the mortars resume their firing to cover the movement of the infantry to its forward assembly position.

*g.* During the mortar-artillery bombardment the assault infantry may have to withdraw a short distance to the rear of the assembly area unless it is dug in. Artillery and mortar observers, with a few riflemen, remain forward. The distance will be less if the attack is perpendicular to the direction of fire. The infantry moves to closest assaulting distance under cover of the final mortar fire, in thick jungle 50 yards or less.

*h.* Jungle tree snipers are not only a menace in themselves but act as observers and frequently direct the fire of ground weapons. Before the attack, during the artillery and mortar bombardment, the trees within the hostile position should be frequently and thoroughly combed by the machine guns. During the progression, tree snipers are the special task of supports.

*i.* Just before the riflemen start forward, machine guns should sweep the zone of attack and continue until their fire is masked. They then cover the flanks of the assaulting force. The assault wave should advance with assault fire. The enemy must be kept off balance, be given no chances to recover or to occupy positions. The timing of the infantry advance with the last major mortar salvo is accomplished by means of the sound power telephone.

*j.* A rolling mortar barrage may be necessary to effect a penetration, or against narrow positions in depth. The rolling barrage should be wide enough to neutralize immediate flanking fires and should also have depth. It is usually advanced by 25 or 50 yard lifts in 4-8 minutes. Riflemen should follow it closely. Sound power lines to all assault companies and mortar observers from battalion and regiment, and batteries are necessary to assure flexibility of barrage fire.

*k.* On breaking into the position the assault force moves rapidly towards its objective, employing assault fire to overcome scattered resistance and prevent the formation of local counterattacks. As the interior of the position is likely to be cleared and more open, the formation will fan out, skirmishers extending. Supports may be used to widen the front. Mopping up by supports and reserves must be thorough. When the objective has been taken, strong patrols are sent back over the zone of attack to complete the mopping up. In case the advance is continued to a new objective, a detachment must be left to prevent re-entry by the enemy.

*l.* When no artillery or massed mortar fire is available or feasible, the infantry will have to go in flat in the "crawling attack" which is usually slow and prolonged. As a rule, bayonets are not fixed as it makes the rifle unwieldy, and it is seldom required. If bunkers or groups are sufficiently far apart they

should be engaged from the front while individuals or small groups of three or four work in with the hand grenade and tommy gun. As soon as one bunker has been reduced, men may be worked up to flank adjacent bunkers. The company weapons platoon should be used to neutralize adjacent and support bunkers. Counter-snipers must be detailed from the supports to clean out enemy tree snipers.

*m.* During daylight, light conditions in the jungle approach those of twilight. The dim light available is necessary to advance with speed and reasonable quiet. Night movement over short distances in the jungle to an assembly area is feasible but difficult. Previous reconnaissance, posting of guides or guide wires, and the noise of machine-gun and artillery fire or of inclement weather to cover the movement will often increase the chances of success. Moonlight is usually desirable in a night attack. Night attacks in dense jungle are seldom successful. Night attacks are more clearly indicated as the density of the jungle decreases.

#### DEFENSE

*a.* The general principles governing the selection and organization of defensive positions are the same as in open warfare. When the flanks cannot be rested on strong obstacles, one or both flanks are refused so as to provide an all-around or perimeter defense. Even though the flanks or rear rest on an apparently impassable obstacle, such as swamps, water lines, or cliffs, the position should be organized for all-around defense since the jungle will permit the enemy to approach and mass within assaulting distance.

*b.* Organizations the size of the company and battalion on a trail position organize their own areas. Larger units organize several areas on the trail in depth. Depth provides greater protection against encirclement.

*c.* Approaches to a position, such as trails and firm ground, are made the responsibility of a single unit and boundaries prescribed accordingly.

*d.* Front-line squads are disposed as described in the section on "Halts." In addition, units the size of a company organize a support line, while units the size of a battalion and larger provide a support and reserve line.

*e.* Every precaution should be taken to keep the normal appearance of the jungle intact. No field of fire is cleared in front and around the position lest it become a conspicuous bull's-eye target for bombers and artillery. Fire lanes 20 to 40 yards long and 1 to 2 yards wide, normal to the position, are cut for individual rifleman and automatic weapons. Automatic weapons are also given a flanking lane. All small-arms fires should be grazing fires. Barbed wire may be laced to trees close to the position. Double apron fence, in single or double rows, is desirable if materials and time are available. Booby traps and trip wires are placed across possible approaches. Fox

## NOTES ON JUNGLE WARFARE

holes and emplacements should be connected up with a crawl or deeper trench close behind. If time permits, log and dirt splinter-proofs strong enough to resist mortar bombs are constructed.

*f.* Observation and snipers' posts are established on the ground and in trees. Forward snipers should be posted in fox holes.

*g.* Mutual flanking machine-gun fires are arranged between adjacent perimeters. When the defensive disposition approaches a position defense with both flanks resting on strong obstacles the machine guns and combat groups are located as described in FM 7-5.

*h.* Telephone wire should be placed alongside of supply trails to guide and restrict traffic.

*i.* During the normal occupation of the position by day, observation is maintained by tree observers and a sentry in each squad. At night the two or three men in forward fox holes divide the night. In case of alert or alarm, sentries are increased. Before dark all personnel go to their combat positions and remain until after first light. Small-arms fire is withheld except in case of actual attack. Front-line men only use the hand grenade exclusively against suspicious noises.

*j.* Occupation of defensive positions must not destroy initiative and lead to a passive attitude. Few defensive battles have ever been won. The defender must not only be resolute but aggressive. The defensive should be regarded as a temporary measure whereby an advantageously selected position may be held with few troops so that a decisive attack may be delivered elsewhere. The jungle facilitates the assumption of the counteroffensive.

*k.* The defender must patrol vigorously to gain information of enemy activity and for the counteroffensive.

*l.* The principal resistance is by fire. Snipers open up on visible targets. All available mortar and artillery fire should be brought to bear on the hostile attack, preferably on its assembly positions before it is launched. Rifles and automatic weapons engage targets which appear in the fire lanes. If the enemy is able to close, he is met with the grenade and bayonet.

*m.* In case of enemy penetrations, troops in support positions and on the flanks hold their positions and block with fire; supports and reserves that are not engaged are moved under cover of trenches or woods to the flank of the penetration to counterattack and retake the ground lost.

*n.* The commander launches a counteroffensive before or after the hostile attack is under way. If launched before the hostile attack it should preferably envelop the hostile envelopment.

*o.* Reliefs to maintain defense can usually be made in daylight.

## SUPPLY AND EVACUATION

*a.* Supplies may be brought in by motor transport, boat or canoe, by native carriers, or dropped by plane. In the last stage, supplies are always handled by troops.

*b.* Columns establish supply, motor maintenance, and salvage points, and a system of medical evacuation.

*c.* During an advance, advance and intermediate supply points must be established forward promptly to serve the most advanced echelons. They are moved forward with the advance.

*d.* Salvage is the responsibility of the task force commander since he will not be immediately backed up by a higher echelon.

*e.* Native supply carriers usually carry back the wounded on their return to the supply point.

## SANITATION AND HEALTH

*a.* The mosquito is more dangerous than the enemy. All commanders, starting with the squad leader, must see that protective mosquito devices are used as long as possible and that atabrine or quinine is taken daily.

*b.* The daily use of salt tablets is essential.

*c.* All water must be chlorinated by unit or by the individual with the canteen tablet.

*d.* Cooking should be by company or platoon as long as the situation permits. Boiling water must be provided for mess gear, else bowel disorders may be serious. The individual soldier wastes so much time in cooking that he is apt to neglect the care and cleaning of equipment, weapons, and ammunition.

*e.* Cuts and sores should always be treated by medical personnel if possible and not by the individual.

*f.* Bathing or washing and care of the feet are most important.

*g.* Small group or individual latrines are required during combat, since anyone walking about at night is certain to be shot by our own troops.

## COMMUNICATIONS

*a.* The radio is very unreliable in the jungle, and restricted as to range.

*b.* Wire communication is the only certain means of long distance communication. For tactical operations and fire control the sound power telephone is invaluable for units the size of a patrol up to the regiment. Two lines should be habitually laid; one between the unit and higher headquarters and one to the heavy weapons.

*c.* Runners are necessary in the battalion and lower units. The regiment and division employs liaison and staff officers for similar missions.

# Target Information

MAJOR DONALD H. FORD, *Air Corps\**  
Instructor, Command and General Staff School

WITH THE increasing emphasis being placed on offensive operations, the question of targets for attack steadily becomes of greater importance. The U.S. Army Air Forces are employing air power on a scale heretofore unknown in the history of warfare. The air arm as an offensive weapon employs its power in two ways; by independent, long-range attack to destroy objectives which are vital to the enemy's ability to wage war, and by close coordination with ground and naval forces in attacking the enemy's military forces.

This difference in type of objective requires a specialization in target information in order to meet the particular needs of each. In addition there is another factor to be considered, namely, the use to which the particular kind of target information will be put. The higher headquarters, for example, will need a somewhat different type of target study than will a combat crew flying a bombing mission. As an effort to meet these different needs and to furnish to each class of user suitable information, target information is divided into three general types:

1. Air estimates for the high command and general staff,
2. Objective folders primarily for group and squadron commanders and for intelligence officers attached to a group or squadron, and
3. Target charts for combat crews to take on their missions.

## AIR ESTIMATES

An air estimate is an analysis of the economic sources and supports of an enemy's ability to wage war, prepared from the point of view of air attack thereon. It studies enemy industries and major activities and compares one such industry or activity with another, considering their vulnerability to air attack and the effect of their injury on the enemy's war effort. This means that each industry requires a complete estimate, such as oil, minerals, aircraft production, steel, transportation, power, etc. The relationship between industries must be determined, and the effect that damage to one will have on another. These problems must be studied and considered before the higher command can answer the question: What shall be bombed and according to what plan? The air estimate is an attempt to make available the necessary information and data to determine that question.

## OBJECTIVE FOLDERS

An objective folder is a compilation of information

\* The writer wishes to express his appreciation to Major John N. Wisdom, AC, for his constructive suggestions in the preparation of this article.

on targets and area characteristics, intended for the strategic and tactical planning of air attack against air objectives located in the area embraced within the objective folder, and also intended for use in briefing combat crews preparatory to such attack. It shows the air objectives in a given area, the approaches to them, the defenses, if known, and any important data concerning the target. Obviously, the objective folder also serves as a medium for the dissemination of information of targets within its area.

The objective folder is primarily for the use of group and squadron commanders and intelligence officers, and is not to be taken into the air. It is a confidential document.

## TARGET CHARTS

The third type of target information is the target chart. It is designed to assist combat crews to locate, distinguish, and approach their objectives, and to estimate distances and bearings to the objective. These charts have gone through not a little change and are still evolving. There are almost as many kinds of target charts as there are actual or potential theaters of operations.

A typical, but by no means universal, chart may be described as follows: It is printed on two sides. One side is on a scale of 1:125,000. This is called the approach side. It shows approaches to the target, and is for the use of the pilot and navigator. The opposite side of the chart is drawn on a scale of 1:10,000 to 1:30,000, depending upon the size of the area, and is for the use of the bombardier. This is called the recognition side of the target chart. The target chart is centered on an important target and the chart is numbered to correspond with the number of the central target. Concentric circles are drawn every two miles on the approach side and usually every 2,000 feet on the recognition side. All targets within a circle having a four-mile radius of the center of the focal target are spotted on the chart. Targets outside the four-mile circle, but within the area shown on the chart, are found on other target charts of the same series. Radiating from the center of the chart are lines representing equal units of the degrees of a circle. Usually the lines are ten degrees, which are numbered from the north. By the means of these azimuths a pilot can plot himself into the target with a minimum of effort and by following the chart has little difficulty in picking up any important landmarks to and near the target.

As suggested, there are many types of target charts and they may vary in elaborateness, depending frequently upon the difficulty of operations. They may differ as to scale and as to composition. Not



## TARGET INFORMATION

little work is being done on perspective type charts. These charts are prepared so as to show the perspective of the target from different approaches and at various elevations and distances from the target. Target charts and perspectives are designed to be taken into the air. These, plus any available aerial photographs, go far towards insuring the success of the aerial mission.

### THE ENGLISH SYSTEM OF TARGET FOLDERS

The English do not have objective folders of the exact type of ours. England, so to speak, is fighting an aerial war in its own backyard. The Royal Air Force concerns itself with individual targets. They make studies of these targets, take frequent aerial photographs, and as they accumulate information of the particular target they place it in a file for that target. This they call a target folder. It combines elements of our target chart and of our objective folder.

### TARGET STRIPS

In North Africa a modified objective folder and target chart was prepared especially for use in that theater. In that area there were few industries, or none at all. It was believed, therefore, that some of the details of an objective folder might be eliminated. A form was prepared consisting of a single sheet, a target strip, in three folds, containing a large-scale photograph of the focal point in the area, a sketch on the same scale, and a small-scale approach map. This strip was extremely valuable for combat intelligence as applied to aircraft functioning in close support and coordinated with other forces. These target strips are excellent for harbor installations and airports. In addition to North Africa, this type of strip has been prepared for operations in other areas, for example, the Aleutians and the Caucasus.

Summarizing as to the general types of target information, there are air estimates for the high command, the objective folder for group and squadron commanders and intelligence officers, and the many types of target charts and perspectives for the combat crews.

Ground units as well as air units should find a wealth of valuable information in objective folders and target charts covering areas in which the ground troops are operating or in which they propose to operate. It is believed desirable, therefore, to consider the objective folder in more detail.

The Commanding General of the Army Air Forces is charged with the responsibility for initiating objective folders pertaining to fixed objectives in all probable theaters of operations. The division set up in Army Air Force Headquarters to meet this responsibility is the Target Information Branch of the Intelligence Section.

One area in which the likelihood of operations are more than probable is not currently covered by objective folders produced by the Target Information

Branch. That area is northern France, the Low Countries, and Germany. These areas are covered by RAF target folders and by the Eighth Air Force target charts, and it has not been deemed necessary or desirable to duplicate this work.

When operations commence in a particular theater, or are imminent, the data assembled for that area is incorporated in an objective folder which is forwarded to the wing or task force headquarters concerned. There the folders are studied and notations made of any further information needed. Obviously, an objective folder, as to certain particulars, may be out-of-date the moment it is printed. This would be true particularly of targets of semi-permanency, such as large depots, supply installations, and the like.

Information necessary for completion of a pertinent folder or to bring it up-to-date is listed on the appropriate A-2 plan, along with essential elements of information, and is so carried until the necessary information is acquired. Folders are retained in the files of wing or task force until such time as the actual attack of specific objectives can be foreseen, when they are forwarded to the proper unit, group, or squadron for study and preparation of attack plans.

Additional information affecting a specific folder in the hands of groups or squadrons will be forwarded to them by higher headquarters and they are charged with the responsibility of keeping the folders current. They also notify higher headquarters of any changes made by them on their own initiative in the objective folders.

Objective folders may be prepared in the field. A situation where this might be done is in an area where no objective folder as yet has been prepared. The folder will be initiated by the headquarters planning the combat mission in that area. It would combine all available and pertinent reports, documents, publications, photographs, maps, and charts of the area. After its initial preparation, the procedure for handling the folder from there on would be as previously outlined. That is, the folders would be passed down to units flying the mission, and these units would keep them current.

Now let us examine the objective folder itself. First, the area that a particular objective folder may cover. Each country is given separate consideration. If the country is relatively small and has few military objectives, but one objective folder will be prepared for that nation. If, however, the size and military importance of a nation is such that to cover it with one objective folder would result in too bulky a document, which would interfere with its usefulness, then the nation will be divided into sub-groups and a separate folder will be prepared for each subdivision. The limits of the areas of these subdivisions are purely arbitrary, although the areas may correspond with the boundaries of a political entity or the borders of a distinct geographical region. An example of such subdivision is Italy. Italy has been

divided into seventeen areas for objective folder coverage. Where a country has been broken down into more than one area, for ready reference the folders of the areas usually will be given a name which will correspond to the name of an important city situated in the area covered by the objective folder. All objective folders in addition to a name are given a number from a coded classification system. Likewise the military targets in the area of the objective folder are numbered by the same system.

The objective folder should contain all obtainable information pertinent to the planning or execution of an air attack of a given objective, together with a brief résumé of the tactical or strategical value to the enemy of such objective.

To be specific, the objective folder is in three sections: maps, photographic, and text. The map section gives the graphic information. The first map is of the objective area, showing its boundaries. In the newer objective folders this is a topographic map. Next is a key map of the objective areas within the country. It is an index map and shows the relation of the particular area to the other objective areas.

All other maps are generally large scale maps: city plans, harbors, airfields, dams, mining districts, oil fields, etc. There may be added an outline map for work sheet purpose.

The photographic section contains photographs of the important targets of the area, where photographs are available. Verticals are preferred because of less distortion.

The text section is divided into two main parts: summary and evaluation of the area, and tabulation of target information. The summary and evaluation of the area covers the objective area as a whole and it will contain a brief description of the area, its importance, its known defenses, a weather analysis, and a summary of flying conditions.

The tabulation of target information is set up in columnar form, by target number, target name, coordinates, description and significance of the target, and the number of the target chart on which this particular target is to be found.

This in brief is the objective folder. It is a source of much information. The objective folder, the air estimate, and the various types of target charts are sources of intelligence information which should not be overlooked by any of the branches of our armed forces.

The objective folder, the target chart, and the air estimate, although they may have been prepared in Washington thousands of miles distant from operations, frequently furnish the information that is needed for the planning and execution of a mission on the battle front.

## Paint from Waste Materials

PAINT is necessary in artificial camouflage. Often, manufactured paint is unobtainable in the theater of operations and it is necessary to produce water resistant paints from waste materials or materials that can be obtained locally.

After several months of experiment, the camouflage unit of the Second Air Force developed several "home-made" paints. Formulas for the preparation of a few of the best are included here.

**G. I. Soap Paint:** Dissolve  $\frac{1}{2}$  bar of G.I. soap in one gallon hot water. Add  $\frac{1}{2}$  gallon waste crankcase oil and stir while adding. Mix in one gallon clay (diatomaceous earth, talc, kaolin are preferable). This results in a satisfactory white paint. Colored pigments or colored earth can be added until desired color is obtained.

**Condensed Milk Paint:** An excellent water resistant paint can be prepared by mixing one part condensed milk, one part water,  $\frac{1}{2}$  part slaked lime and one part color pigment.

**Gelatin Glue Paint:** A particularly useful paint for toning down vehicles, equipment, and other material. Dissolve  $\frac{1}{4}$  pound gelatin glue in two gallons of wa-

ter. Add one gallon of local dirt, sifted or ground to eliminate large particles. (This paint is not too satisfactory on fabrics.)

Colored pigments are obtained from rocks and clays in almost every part of the world. To convert colored rocks into pigment, a simple mortar can be constructed of a 12" section of 8" pipe with a  $\frac{3}{4}$  inch sheet of iron welded to one end to make a bottom. A length of 2" pipe with one end flattened makes a good pestle. The crushed rock is then sifted through an 80-mesh screen.

Waste coffee grounds make a very satisfactory dark pigment when treated as follows: Place coffee grounds in a bucket or similar container and heat over a fire. Occasional stirring is necessary to obtain best charring. When the thick smoke stops, the grounds are thoroughly carbonized. It is necessary to transfer the grounds to a closed container at this point to allow cooling without oxidation of the carbon. The grounds, after cooling, can be crushed with a cup and spoon. The powdered carbon should be sifted through an 80-mesh screen; the finer the powder the better the resulting paint. (From *Aviation Engineer Notes* September 1943).

# USASOS SWPA

LIEUTENANT COLONEL RAYMOND O. FORD, *Ordnance Department*  
Instructor, Command and General Staff School

TO THE average reader the above combination of letters (pronounced u-sah-sose) probably does not mean very much, but to American soldiers fighting in one far corner of the world it means a lot: United States Army Services of Supply, Southwest Pacific Area. To the soldier it is the organization that feeds him, clothes him, brings him cigarettes, entertains him during off-duty hours, provides a hospital bed for him if he is wounded or falls victim to disease. If it were not for this organization our combat forces could not carry on the battle in the jungle islands of the Southwest Pacific. That on the whole it is doing a good job, I can personally attest, as I spent two months this summer visiting most of its installations. I traveled from its rear bases in Australia to the forward beachheads in New Guinea where the supplies go on the shoulders of natives up to the soldiers fighting in the jungle.

The SOS is feeding the soldiers well. Some of the troops in the forward area may get tired of "C" and "K" rations—they are a monotonous diet for any length of time—but I saw a portable refrigerator arrive at an advance beachhead a few miles south of Salamaua when the Japs still held that town. This meant that it would be possible to bring fresh meat up to a supply point within artillery range of the enemy. Fresh meat and vegetables pay big dividends in the combat efficiency of our troops. The chief of staff of one division told me that whenever they were able to get fresh rations up to the men, the sick rate immediately went down.

The SOS is doing this feeding job without taxing the food reserves of this country. Practically all the rations for the American Army in the Southwest Pacific Area are procured locally. A Subsistence Depot has been established under the Chief Quartermaster, SOS, and this depot is responsible for the procurement of all subsistence required by our soldiers. American agricultural experts are helping the farmers of Australia increase the productivity of their land. American engineers and machinery have revolutionized the Australian canning industry, so that this increased food production can be preserved and distributed to soldiers located on islands a thousand miles away. A brewery in one large Australian city has a large modern research laboratory. Arrangements have been made so that the officers from this Subsistence Depot, who are expert in the chemistry of foods, can use these facilities for tests and for carrying on a program of research and development.

Clothing the soldier on these islands is a problem. Under tropical conditions the cloth rots in a short time, termites have found the flavor of the soles of

shoes to their liking. For the soldier who is going into the jungle to fight, special equipment is required. By the time a man has walked very far he is inspired to get rid of everything but the most essential. This means replacements when he gets back. The Quartermaster is keeping a supply of the required items at forward supply points and back in Australia is trying to develop clothing that will better withstand the conditions of the jungle. In the case of clothing, much is being done to procure as many items in Australia as possible.

Cigarettes are going up to the soldiers at the front. For them they are included in the gratuitous issue of the ration. Not as many as they would like, but they are getting them. I traveled along the north coast of New Guinea in an LCVP (Landing Craft Vehicle Personnel) that went at night under Jap shell fire into the bay in which the advance beachhead was located. Only when it was found that I didn't smoke was I permitted to ride the boat full of gratuitous issue cigarettes.

The Special Services Division of the SOS is trying to keep the soldiers in New Guinea amused. And this is important. There is nothing for the soldier to do when he is through with his work for the day, and a movie or a camp show to divert his mind for a couple of hours helps a lot. Sitting on the side of a hill under the stars outside Oro Bay, I laughed just as hard at Charles Coburn solving his Washington housing problem in "The More the Merrier" as I had a short time before in the War Department Theater at Fort Leavenworth. And I didn't have to pay twelve cents either.

The SOS is establishing hospitals as far forward as possible. Men cannot fight without getting wounded. The boats which carry supplies forward along the shore of New Guinea bring back the wounded to hospitals which have been established at the advance bases. True, they are in tents among the palm trees, but they provide medical care and attention for the patients until they are evacuated to the large hospital units in the base sections of Australia. The medical personnel of the SOS is working hard to keep the men out of their hospitals. One of the principal diseases prevalent in the region has been malaria. The malaria control units are very active around the locations with large numbers of troops. All of this is bringing the malaria rate down.

Studying this SOS organization from the standpoint of the Leavenworth instructor raised the question in my mind: "Is this different from what we teach, following the principles of FM 100-10, the Field Service Regulations on Administration?" After



looking it over rather carefully I decided that basically it was not. Of course the conditions in this theater are not the same as those pictured when FM 100-10 was written, and it has been necessary to make some changes to meet the local conditions, but fundamentally the basic principles have been followed.

Australia has been divided into base sections in which the supplies brought over from the United States and purchased locally are stored. In New Guinea the SOS has established advance bases under an advance section. The supplies are brought from the base sections in Australia to the advance bases by boat. They are stored in these advance bases until they are needed by the combat troops, when they are sent forward to beachheads by small boats, trawlers and landing craft.

In both cases we have the communications zone divided into base sections for storing supplies in large quantities. In both cases we have an advance section storing supplies for distribution to the combat troops. In the Southwest Pacific, however, instead of a narrow line separating the advance section from the base section, we have from one to two thousand miles of water. The transfer of supplies from the base to the advance section instead of being a matter of hours, or at the most a day or two, is a matter of weeks. This means that the level of stocks in the advance bases of New Guinea must be considerably higher than the levels that we teach for an advance section.

The distribution of supplies from the advance section to the rail head in the combat zone is replaced by the distribution from the advance bases by boat to a beachhead farther up the coast or on a nearby occupied island. This movement might have been controlled by a regulating officer in accordance with the book, but actually is controlled by the Advance Base Transportation Officer who is responsible,

in conjunction with the Navy, for the operation of the small ships.

From the point of view of the school teacher, this shows that we can teach you the basic principles at Fort Leavenworth, and when you get out into the field these basic principles still will work, although you will have to modify the details to meet your local conditions.

These excessively long lines of communications within the theater have put a tremendous load on the SOS. It means that many more service troops are required than in the average theater of operations. For rough estimating purposes a figure of one SOS soldier for every two combat soldiers has been used. One of the senior staff officers in the Headquarters of USASOS told me that in the Southwest Pacific Area this figure was just reversed. They needed two SOS soldiers for every combat soldier. The principles of combat are the same as anywhere else, but the fighting is done in small units. For training for this type of combat, leadership of one individual leading two or three men must be stressed; every individual must know his job. But the supply problem is multiplied due to the dispersion of combat units into small groups, to the long distances that supplies must be transported, and to the higher levels of reserves that must be stocked at each point along the line of distribution as a safeguard against failure of the transportation system.

So for USASOS SWPA to support the operations of our combat forces in this far corner of the world a large organization is necessary. The basic principles of our Field Service Regulations can be followed, but the details must be modified to meet conditions. And to the soldier fighting in New Guinea, and we hope before long even farther north, USASOS SWPA represents his sole source of existence and means to carry on the battle.

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Here are a few of the "musts." No matter how the boys may resent it, march the hell out of them UP HILL, with full packs. Few people back home really have any idea what condition means. We have found that practically every sound soldier can be trained to the condition of a creditable marathon runner. Don't spare the horses. The second thing is impress your officers and men with the fact that when their unit is selected to go into action the bell has rung and their turn to give their lives for their country has arrived. You expect every leader to be at the point of greatest danger and you will be up there yourself.

Fancy tactics and trick plays are insignificant. Naturally, if there is time, you work out the best simple plan of attack that the terrain and your supporting arms afford. Once the show starts it is leadership and condition.

—Extracts from a letter of a battalion commander  
wounded in Sicily.

# River Line Operations

LIEUTENANT COLONEL JAY C. WHITEHAIR, *Cavalry*  
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LET us imagine ourselves members of General von Kleist's headquarters on the border of Luxembourg ("X" in Figure 1). It is early morning on 10 May 1940.

Fifty kilometers to the west lie the forts of Liege. Another fifty kilometers to the west lies the Ardennes



FIGURE 1.

Forest. Thirty kilometers through the forest lies Sedan ("S" in Figure 1) on the Meuse River. Beyond lies France.

To the north of Sedan waits the French Ninth Army, the Sixth Army, the British Forces, and the French Seventh Army, in that order. From Sedan to the south stretches the Maginot Line.

We know that the French have anchored their Maginot Line on that part of the Meuse River where it passes through the Ardennes Forest. In fact, for years we have read military treatises by high French strategists on the impossibility of a large scale military operation through the Ardennes Forest and across the Meuse.

We break through here! Then west to the coast! If we are successful we may accomplish the largest encirclement in history, for this same morning other German armies attack north through Holland.

The key to all is the crossing of the Meuse. We know that the French have two bridgeheads, one at Sedan, the other Mézières ("M" west of Sedan in Figure 1).

Von Kleist publishes his Order of the Day:

"This side of the Meuse River there cannot be for a man of this column any such thing as a rest or a halt. The column must advance day and night, positively without stopping, without looking right or left. We must take fullest advantage of the enemy's surprise and the disorder of his positions, all with one single pur-

pose in mind, the purpose of putting quickly and by way of surprise some of our detachments on the opposite bank of the Meuse. There is no other way for us to carry out our orders. And the number of losses we must take will be smaller than if we allow the enemy time to get his bearings and make plans for defense. . . ."

For six long months, while the world said, "Phoney War," we have been training for this one operation. Forty-six thousand vehicles are in assembly areas ready to join the column.

0535: The first light motorized detachments jump across the border—they carry prepared platforms to place over obstacles.

During the day: breakthrough of first line of defense in Luxembourg—a little beyond Belgian frontier at nightfall.

11th May: Thru Neufchâteau—driving the entire line—two French divisions are overcome—column slowed by considerable demolitions—dive bombers blast everything ahead of the column.

The French 9th Army is moving north to intercept the northern German attack.

12th May: We are into the Ardennes Forest— islands of resistance of the French are by-passed. The forest with its defiles and ravines is extremely difficult, but the pioneers keep forcing the columns ahead. By nightfall advanced scouts look down on the valley of the Meuse. At this moment a motorized division is falling in to join this same column north of Coblenz, 250 kilometers east.

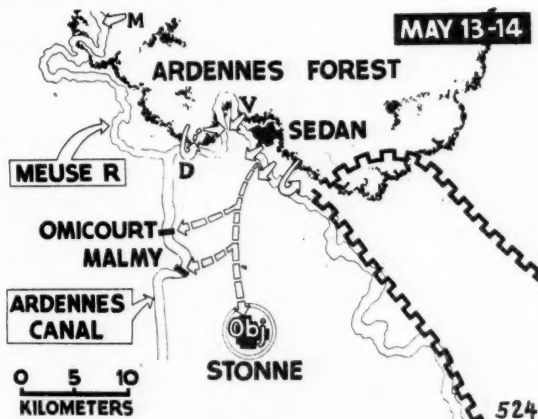


FIGURE 2.

13th May: At noon we are along the Meuse (Figure 2). 1200: a systematic four-hour bombardment by airplanes of the enemy's west bank positions. Our artillery is brought up under cover of this bombardment. Engineers bring their crossing equipment to the banks. Artillery is in position.



At 1600 the leap across the river in pneumatic boats and ferries—attempt crossing in five places—two are repulsed—three successful—troops at Donchery ("D" in Figure 2) later cross at Villette ("V").

General Reinhardt has crossed his armor at Montherme ("M" in Figure 2)—1st objectives reached by nightfall. Push ahead during night; bridge is built.

14th May: General Guderian pushes toward high ground at Stonne—French counterattack beaten back—3,000 prisoners—Omicourt and Malmy bridges across Ardennes canal left intact by French—drive French to west—cover bridge building—bridge finished by midnight.

15th May: Stonne captured—General Reinhardt's armor drives on Liart 60 kilometers west (Figure 3).

Columns pour across bridges.

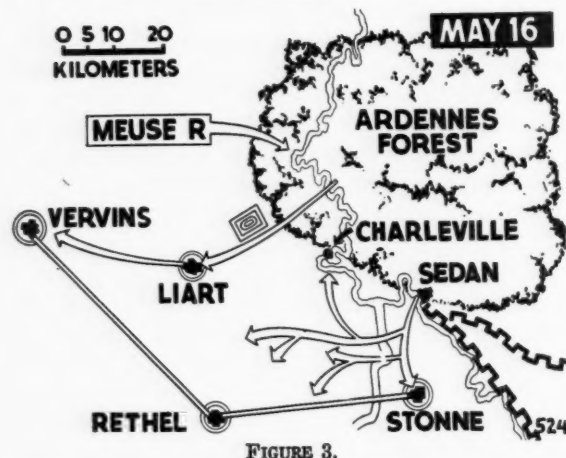


FIGURE 3.

16th May: Bridgehead, Vervins-Rethel-Stonne, created—start of spearhead to west.

22nd May: Reach Abbeville on seacoast—turn north and south—1,000,000 Allied troops to north cut off from main army.

28th May: Dunkerque.

Thus we see the actions which led up to one of the greatest encirclements in military history. All of this in spite of the fact that military scientists throughout history have considered unfordable rivers as among the greatest obstructions to a successful military operation. Nevertheless this is but another example in recent warfare of the tremendous success that the determined invader has had with his river crossings, whether the river was defended or not. It is interesting to note that the operations between the Russians and the Germans have been marked by the fact that it is almost entirely a war of successive river crossings.

There is one thing that is extremely noticeable in the river crossings of the past few years and that is the absolute necessity for air superiority at the time and in the locality of the river crossing. It is for this reason that it is necessary that any discussion such

as this be based on the assumption that the attacker has been able to attain air superiority throughout the operation.

We must think of a river crossing as a special operation with technical and tactical preparations entirely proportionate to the size of the river and the strength of the enemy.

In considering any river crossing, there are at least four fundamentals which must be given complete attention. First, let us consider our mission. Needless to say a river crossing is too difficult an operation to be attempted for the mere purpose of crossing the river itself. In other words, the river crossing will be a means to an end, the end probably being the mission which has been assigned by the higher commander. Because of the tremendous amount of preparation that is necessary, it is extremely important that this mission be given well in advance of the prospective operation.

Next we must consider the details of the river itself. These include both technical and tactical details. In other words, we must consider the mechanical difficulties of crossing the river itself, as well as those additional difficulties which are brought upon us by reason of the distribution, composition, and strength of the enemy's forces.

Next we must make an extremely careful study of the enemy situation as it exists now or will exist at the time of the crossing. This study cannot be of a general nature, but must be extremely specific, as the success of our operation may hinge upon those small details of enemy equipment, morale, or exact disposition which might be easily overlooked in a general G-2 estimate of the enemy situation. And finally, but certainly not least important, we must consider what means we have available to effect our crossing. These means not only include the necessary engineer equipment to cross our assault echelons and build the necessary bridges across the river, but also the great preponderance of strength that is necessary to overcome the enemy completely in this particular locality, in spite of the fact that he has the advantage of a strong barrier across his front. The need of this preponderance of means has perhaps best been stated by one of our higher commanders who commented that, "In effect, all river crossings are penetrations of an enemy position, with the resulting necessity of being able to bring all available firepower and resources to the center of gravity."

Perhaps we can best visualize the necessary steps in a river crossing if we consider the sequence of events which might occur within a particular force after it has received orders to make a crossing and seize an objective on the enemy side.

It is our hope that our mission will be assigned early enough to provide for the following steps:

We will first apply ourselves to a most detailed study of the terrain involved. This study will be originally made from maps and then from all avail-

## RIVER LINE OPERATIONS

able aerial photographs. If we have time we will actually make scale models of the ground involved. This terrain study will probably continue until the crossing has been completed.

If there are any of the enemy on our side of the river, it is absolutely necessary that they be cleared before our operation is initiated. This may involve an attack on the enemy, which may be an entirely separate operation from the river crossing itself. Or it may be possible to seize whatever bridges are in the rear of the enemy, either by rapid encirclement by highly mobile forces, or perhaps by attack by airborne troops. If we can seize the bridges behind the enemy then our problem of crossing may be greatly decreased. However, we may generally expect that the enemy will be successful in destroying the bridges before we are able to secure them.

It is now incumbent upon us to start our reconnaissance at once. On the near side of the river we will certainly look for favorable roads and approaches, positions for our artillery, covered assembly areas, dominating terrain which will permit us to bring all available fire to bear upon the enemy, and locations for bridges and ferry sites.

During this reconnaissance, or perhaps even before, we will be most interested in finding, if possible, a re-entrant along the course of the river to consider as a possible location for our attack.

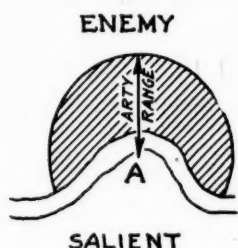


FIGURE 4.

A re-entrant will have marked advantages over a salient as a location for an attack in that we will have to neutralize a much smaller area in order to protect our bridging site from hostile artillery fire. For example, in Figure 4, in order to protect our bridging

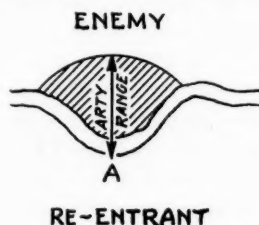


FIGURE 5.

site, "A," from hostile artillery fire it will be necessary to seize a much larger extent of terrain (shaded area) than will be the case as shown in Figure 5. However when we consider the use of a re-entrant, it is necessary that we also consider the necessity for

sufficient maneuver room for the use of our forces on the enemy side of the river. In other words, it is easy to visualize a situation where we might cross the river into a bottleneck which would not permit our attacking forces sufficient room to disperse and where they could be easily shelled or bombed out of existence.

In the river itself we will look for a stretch which has an easy current, is sufficiently deep to float our pontoons, is free of obstacles such as reefs and islands, and where the banks are reasonably suitable for movement onto and off of our ponton bridge.

On the far side of the river we will certainly study the enemy defense positions, including possible machine-gun and artillery locations, the road net, and proper terrain for objectives. We will also favor an area which is lacking in additional obstacles. For example, could there be anything more depressing than to use all the available engineer means which we have at hand in the main river crossing itself, and then on crossing find that we are faced with swamps or additional streams which we do not have the additional engineer means to cross?

In discussing this necessary reconnaissance it is apparent that we have set quite a task for ourselves, and obviously the question immediately arises as to how all of this information can be obtained. Perhaps the answer is that on the near side of the river practically all staff officers and commanders will make personal reconnaissance, limited only by the necessity for secrecy. In getting information of the river itself, our engineers will be of extreme value, as will the air force in securing for us aerial photographs. On the far side of the river we are practically limited to aerial reconnaissance, ground observation (as much as we are able to get from our dominating terrain), cavalry patrols, and possibly agents operating in enemy territory.

This brings us to our scheme of maneuver or crossing plan. Perhaps the biggest feature that can be brought out here is the absolute necessity for crossing on wide fronts with a plan which is flexible enough to be able to exploit whichever one of these fronts shows the most success. We must be careful to avoid picking only one place for our crossing and completing our whole plan based on a successful crossing at this location. It has been proved in recent campaigns that the spot most blessed by nature for a river crossing will be the spot best defended by the enemy. So we must be prepared mentally and physically to "exploit success" to the fullest, and to accept failure at any point without destruction of our entire plan.

The majority of successful attackers in recent years have had great success by the use of "feints." These feints consist of bona fide attempts to cross the river. They are distinguished from the regular crossing fronts by the distance which they may be from the main operation.

In August 1941, while attempting to cross the Dnieper River south of Kiev, the Germans developed a scheme of maneuver which included several attempted crossings near Kremenchug, and a feint at a distance of some twenty-five miles away. The main crossings were repulsed, while the feint itself was completely successful. The plan in effect was flexible enough to permit the immediate movement of reserves to the successful crossing and a bridge was built there, over which poured the bulk of the German forces who were then successfully making an encircling movement and eventually capturing their original objective from the rear. Later the bridge was moved to the location of the attempted crossings as it was more favored by the existing road net.

The advantage of the feint is that if the enemy does not move reserves to combat the operation then the feint will probably be successful. Whereas if the enemy does move his reserves to the location of the feint then there is that much less force to neutralize at the site of the main crossing.

It is normal to decentralize our command for the initial assault across the river. In other words, control will pass down to the regiment and finally to battalions for the initial attack. This permits a high degree of personal command during the most risky phase of the operation. It is then necessary to attempt to regain this control on the opposite bank of the river as succeeding objectives are captured. However, this requires most careful coordination in regard to location of objectives, time of attack, and assistance to adjacent units. Otherwise our entire plan may be reduced to an ineffectual piecemeal attack.

A great many military writers have suggested the advisability of attacking a river line just before dawn. This permits our troops to have the protection of darkness during their initial leap across the river. It may materially reduce losses from small-arms fire and observed artillery fire. It also permits us the use of the first daylight to reorganize our forces on the opposite bank of the river and to bring aimed fire on known enemy positions. However, this has a marked disadvantage in that surprise will probably be lost, as we usually find that most defenders are maintaining their most alert watch during the hour prior to dawn. This fact has been recognized by many commanders in recent campaigns in setting their time of attack. For example: The Japanese attacked across the Straits of Singapore (in effect, a river crossing) in February of 1942 at 2300. The Germans attacked across the Meuse River as stated earlier at 1600. The Germans crossed the Somme at Offoy on 6 June 1940 at 1900. A rather ironical event occurred during the German crossing of the Rhine in the vicinity of Colmar at 1000 on 15 June 1940. The French had been extremely alert the previous night and it was stated that the slightest noise from the German shore brought a large volume of fire from the French

forces. However, the French, expecting a daylight attack, relaxed their watch an hour or so after daylight and the Germans reported that the French were completely unprepared for the attack; in fact, the Germans stated that some of the French soldiers were found in bed.

The above cases lead one to believe that the physical advantages of a dawn attack may often be offset by the psychological advantage of a surprise attack at some other hour.

If decentralization is to be employed, it is necessary that we be careful that our subordinate commanders have definite objectives set for them so that the individual movement of the separate tactical groupings will blend into a coordinated plan. Let us consider these objectives briefly.

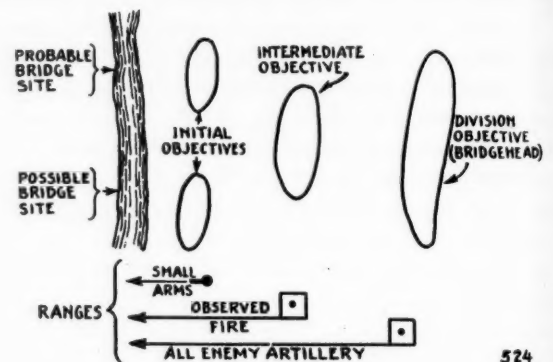


FIGURE 6.

As will be noted in Figure 6, the objectives have been classified as initial, intermediate, and division objective (or bridgehead).

The purpose of the initial objective is to deny the enemy small-arms fire on the crossing site so that further operations will not be impeded by constant casualties from the lighter weapons. It is upon the capture of this objective and its subsequent organization that we will expect control to pass from battalion commanders up to regimental commanders.

The intermediate objective has the purpose of stopping observed artillery fire. The minimum distance at which this objective may be located is obviously governed by terrain, and the maximum distance is governed by both terrain and the maximum effective range of our artillery. As a general thing, upon the capture of this objective we will normally expect to start the construction of our ponton bridge. However we cannot lay this down as a hard and fast rule when we consider that in at least one crossing the Germans started construction of a ponton bridge immediately after the capture of the initial objective, and while it was true that this bridge was destroyed by shell fire three times, they had reserve bridging equipment present for reconstruction of the bridge. One must assume that they had expected these losses and felt they were worth while in terms of time saved.



It is in the attempt to capture the intermediate objective that we may expect the first heavy enemy resistance, as the time elapsed after the original assault will probably permit the enemy to bring forward their reserves for the purpose of violent counterattack. It is for this reason that we must be ready for immediate organization of the ground taken, in order that we may not be pushed back into the river.

It is very possible that due to the particular formation of the terrain the initial objective and the intermediate objective may be one and the same thing. If, for example, the opposite side of the river is level for a few hundred yards and thereafter a ridge abruptly rises from the valley, it may be possible that this may be the only position from which the enemy is able to bring small-arms fire to bear and to locate his artillery observation posts.

The division objective, or bridgehead, is located at such distance that it will stop all enemy artillery fire upon our crossing site. It is not until we have gained this objective that we can feel that we have secured a sufficient toe hold on the enemy's side of the river to start bringing across our supplies and other equipment.

It is apparent at this stage of the crossing as perhaps at no other time before, how necessary it is that we have a preponderance of means available and that our plans be so coordinated that these means can be brought immediately to our disposal. We must be ready either to defend against increasing enemy forces or to continue the advance, because if we stay in this situation without further movement we may expect all enemy resources to be brought to bear to eject this ulcer from its body.

## Lessons from the New Guinea Campaign

### From a Report of a General Officer

1. To INSURE adequate control and the proper functioning of the chain of command and to minimize straggling, officers and men must be immediately identifiable as to rank and organization from some appreciable distance. Organizational identification for enlisted men should include the company designations.

2. The traditional aids for the development and maintenance of discipline and promoting unit pride need more exacting emphasis. The goal must be a unit wherein individuals have mutual trust in each other's soldierly qualities and the utmost confidence in the ability of the unit to stick together under any circumstances and perform the task assigned.

3. Officers and noncommissioned officers need to be taught exactly what is meant by the chain of command and how to use it practically.

4. Authority should exist for the transfer of any individual within the command of a general officer or within any task force.

5. Authority should exist to transfer officers lacking in combat ability from units in combat to the Services of Supply for further reassignment.

6. Authority to make battlefield promotions in

most exceptional cases in the lower commissioned grades should be granted a general officer.

7. Trained replacement personnel should be available from the start of a campaign.

8. When patients are discharged from hospitals serving combat troops, they should not be carried on a duty status but on a convalescent status until they have been sufficiently recovered and hardened for full duty at the front.

9. A graves registration unit and qualified postal personnel should be assigned from the start of a campaign.

10. Military police should be made available for the collection and disposition of stragglers and prisoners of war.

11. A defense platoon or other appropriate unit should be provided for the protection of any headquarters higher than that of the regiment.

12. Cemeteries should not be located in places frequently passed by combat troops.

13. The use of the telephone for routine administration must be definitely discouraged from the beginning of the campaign. Necessary conversations on administrative matters must be of a telegraphic brevity.

# A Check List for Summary Courts

MAJOR WILLIAM H. EDWARDS, *Adjutant General's Department*  
Adjutant General, Command and General Staff School

CHECK LIST	REFERENCES*	NOTES
<b>BEFORE TRIAL</b>		
1. Study the case.....		
2. Examine Charge Sheet and supporting papers.....		
3. What proof is required to sustain a finding of guilty?.....	Ch. XXVI	
4. What is the allowable sentence for the offense charged?.....	Pages 97-101, Par.17	
5. When and where will trial be held?.....		
6. Have accused and all witnesses been notified?.....		
7. Does accused desire that additional witnesses be called?.....		
8. Have you arranged for use of the court or other room for the trial?.....		
9. Are depositions necessary and have you taken necessary action to obtain them?.....	Par. 98	
<b>DURING TRIAL</b>		
10. Is accused present?.....		
11. Are all witnesses present?.....		It is good form to exclude witnesses from the courtroom except when necessary to take their testimony.
12. Was the Court called to order?.....		
13. Read matter appearing on pages 2 and 3 of Charge Sheet to accused.....		This action arraigns the accused.
14. Does accused fully understand the offenses charged?.....		
15. Does accused have any special pleas?.....	Pages 50-54	
16. Does accused plead "Guilty" or "Not Guilty" to the general issue?.....		
17. In case plea of guilty is entered have you explained its meaning and effect to accused?.....	Par. 70 & 82	If accused desires plea of guilty to stand, it is permissible to proceed to a finding and sentence without further delay.
18. After explanation, does accused desire to change his plea to "Not Guilty"?.....		
19. Was each witness sworn?.....		
20. Does accused desire to cross-examine each or any witness?.....		
21. Has accused been advised of his rights?.....	Par. 75a, 76, & 120d	
22. Have you observed "Rules of Evidence"?.....	Ch. XXV	
23. Is there sufficient competent evidence to warrant a finding of guilty?.....		
24. What is your finding?.....		
25. What punishment will best serve as a deterrent?.....		
26. Is the punishment within allowable limits?.....	Par. 17	Refer to Item 4. See Appendix 9 for form.
27. Have you been swayed by sympathy or prejudice?.....		
28. Have you "talked it over" with accused?.....		In a kindly way, point out ways to avoid future involvement—try to learn accused's point of view (advisory).
29. Announce the findings and sentence.....		
30. Adjournment.....		
<b>AFTER TRIAL</b>		
31. Have you studied Appendix 8 MCM?*	Page 272	
32. If accused is a noncommissioned officer below the rank of Technical Sergeant does the record disclose he did not object to trial by Summary Court-Martial or is such trial otherwise properly authorized?.....	Par. 16; A.W. 2	
33. Is all data properly recorded on your portion of Charge Sheet?.....	Page 272	
34. Have you signed all three copies of Charge Sheet?.....		
35. Have you delivered all three copies of completed Charge Sheet to the commanding officer for his action?.....		

\* Manual for Courts-Martial, 1928.



# Operations in the Aleutians

CAPTAIN ROBERT D. ORR, *Quartermaster Corps*

## THE ALEUTIAN THEATER

LAST summer the United States briefly became aware of the Aleutian Islands. In May our forces assaulted and regained Attu. In August Kiska was occupied subsequent to the evacuation of the Japanese, who had held that island for more than a year. Prior to this brief flurry in the press, few Americans had ever given much thought to these island possessions which stretch almost across the Pacific Ocean. Since August the Aleutian Chain has again become an almost forgotten area.

Military activity has of course been more intense in the Southwest Pacific and in the Mediterranean theaters. It is quite natural, therefore, that military as well as public attention has been focused on those areas to a far greater degree than on this northern front. It is not meant by this statement to minimize the Aleutian theater as a front, however, nor to imply that the men who have made operations in that area successful have not accomplished a mission of the greatest difficulty. Far from that, for the operations along that lonely chain, both those fully portrayed and those almost unknown, have required the greatest possible amount of careful planning, initiative, and back-breaking work under the most trying conditions which can perhaps be encountered anywhere on the globe.

The Japanese beat us to the punch when they landed troops on Kiska and Attu in June 1942. But very silently the Alaska Defense Command had, prior to his arrival, put one over on the enemy by establishing the necessary bases to keep him from advancing any nearer to the interior of Alaska. Then before the Japanese could become organized and move on, United States troops landed out on Adak in August 1942, and on Amchitka in January. Both those operations were tough ones, for it is no easy task to occupy deserted islands with no natural resources whatsoever and where Nature places almost inconceivable obstacles in the way. There was relatively light enemy opposition, but none was needed to make the job a hazardous one.

It was at this stage of the game that the writer first put in an appearance in the Aleutian Islands. He was fortunate enough to be there for the clean-up operations and to see the Japanese finally driven from those specks of American territory. It would perhaps be well before continuing to indicate what his mission was.

## THE MISSION

There exists in the Office of the Quartermaster General the Research and Development Branch. It is the nucleus of all research in the Quartermaster

Corps. Some of the functions of the organization are to conduct research on and to develop new items of Quartermaster issue, or to improve on the old. It is, furthermore, its job to eliminate items for which there is no longer a need. Because the trends of modern warfare demand equipment never before considered for the Army, the job of providing Quartermaster equipment to meet required conditions is no small task.

In order to ascertain just what is or is not needed by the Arms and Services, the Research and Development Branch must have numerous guideposts to direct its efforts along the desired channels.

Among other sources, information is constantly being culled from reports and definite requests from the field. Officers and men returning from combat zones serve as another means of discovering where certain deficiencies exist. Neither of these methods is entirely satisfactory, however, for information from the field generally takes a lengthy period of time to go through channels, and men returned from a combat zone have generally had more important immediate jobs to do when they were in the front lines than trying to determine the adequacy of the multitudinous array of Quartermaster clothing, equipment, and food.

It has been found, therefore, that the speediest and most efficient way to obtain the desired information is to have an observer right on the spot. It is not a question of having that observer drop in on a base or an operation, take a hasty look around, and depart with a smattering of comments on the efficiency or otherwise of Quartermaster items of issue. The writer's commanding officer very definitely prescribes that his observers spend enough time investigating matters and talking to people, officers and enlisted men, to understand fully just what the situation is. By living for an extended period of time in any area, the observer as a human being can also pretty well attest to the requirements of a particular theater.

After gathering bits of information here and there on any particular piece of equipment, the observer then must needs analyze the comments and form an integrated picture of just what is required. It is his job at this juncture to send back reports indicating his findings directly to the Research and Development Branch. Eventually he returns with as complete a story as possible.

It would be quite foolhardy to effect radical changes on most pieces of equipment entirely on the basis of the reactions of one observer. It is necessary, therefore, that the Research and Development Branch exercise caution in recommending changes.

Comments from other observers on the same or a similar piece of equipment must be analyzed and weighed against one another in collaboration with other information at hand. If the analysis indicates that an alteration in a piece of equipment is needed or a new item required, the using Arm or Service is contacted for approval or disapproval, and the wheels are set in motion to bring about the desired objective.

It was as a field observer for the Research and Development Branch of the Office of the Quartermaster General, therefore, that the writer found himself taking part in operations in the Aleutians during the spring and summer of 1943.

#### ALEUTIAN PROBLEMS

Arriving in late February, he found the chain still in the throes of wintry blasts. Contrary to common belief, however, the Aleutian Islands have far from an Arctic climate. A look at the map will readily show just how far south the chain actually extends. Furthermore, the Japanese Current flowing to the south of the islands keeps the temperature higher than would be normal at that latitude. But that same current also creates a turbulence in the region which has caused the Aleutians to be known as the weather factory for the entire North American continent. While the thermometer seldom drops below freezing, therefore, storms of severe intensity are the rule rather than the exception in the North Pacific. It is the home of the "Williwaw," a peculiar natural phenomenon which gives the impression that the wind is hurling itself at you from all points of the compass at once.

The weather is not the only natural obstacle, however, for the terrain of those islands is particularly annoying and dissimilar from that found in most other combat sectors. There are no trees on the Aleutians, save for one or two flown west by the ever-ingenuous Air Force and promptly labelled Adak or Attu National Forest as the case may be. Tundra is about the only vegetation. It forms a kind of rug of grass and moss for a few inches on top of layers of mud and muck which extend downward for from six inches to sometimes an almost unfathomable depth. Until roads can be constructed with no little difficulty, mobile transportation is well-nigh impossible. Even the rugged jeep loses face in attempting to negotiate the terrain. A good "Cat Skinner" can frequently maneuver a D-4 or D-6 with some degree of success but only if the tracks are far wider than normal. In other words, newspaper reports mentioning "rocky" Kiska are describing only the ridges and mountain tops, not the lower ground where bases are established.

Remoteness from any civilization whatsoever is added to the complications of impossible weather and unnegotiable terrain to provide a thoroughly unlovely picture for the troops to whom falls the job of launching a front in this ill-starred portion of the world. Except for abundant wild fowl, fish, some

blue foxes, seals, and the last vestiges of the almost extinct sea otter there has been almost no other life on the Aleutians whatsoever since the handful of native Aleuts were removed after the Japanese moved in. Consequently when the Army has landed men and equipment on any of the islands, regardless of the presence or absence of the enemy, it has had to transport absolutely everything along with those men in order for them even to exist. As a result, up until the attacks on Attu and Kiska were launched, the battle has been almost entirely one of supply, and even those two operations were supply jobs to the greatest extent.

Because of the inhospitable weather and terrain, special equipment, Quartermaster as well as all other types, has been necessary. Since it rains so much of the time, clothing must be either waterproof or at least water repellent. Because of the weather, as many of the supplies as possible must be under cover, and warehouses have to be set well into the ground and revetments thrown up about them to prevent the wind from carrying them away. To move supplies around, wide-track tractors and track-laying trailers must be provided. These are but a very few of the equipment demands found in that remote front.

Unexpected needs for normal equipment also keep cropping up, and many pieces of equipment, strangely enough, appear to have an almost endless durability for some unusual cause, or they fall to pieces more rapidly than usual.

As can readily be visualized the handling and storage of supplies at an Aleutian base is not easy. It takes time and endless effort to accomplish the job, which to a great extent is manual labor alone. Also, as in all far away regions, the time factor involved in requisitioning supplies from the United States—or "the Old Country," as it is known up there—is a constant headache. Needs must consequently be anticipated months in advance. Requisitions based on those anticipated demands frequently appear inordinately large and are often edited by agencies supplying whatever equipment it may be from the United States. Such factors as that result in no small amount of profanity among harried supply officers along the Aleutian Chain.

#### THE ATTU OPERATION

All the problems normal to the Aleutians existed in the Attu operation together with the added complication of facing a very determined enemy.

Two landing attacks were made on Attu, from the north alongside Holtz Bay, and from the south in Massacre Bay. Finding no opposition on the beaches, the assault carried well inland before the Japanese defenses were encountered. At the very outset, therefore, the task of bringing supplies up to the front lines became difficult to the extreme, for the terrain on Attu was as bad or worse than that found elsewhere in the Aleutian Chain.

In Massacre Valley effective use was made of the streambed of Massacre Creek as a supply road inland from the beach. Tractors and trailers could easily negotiate this natural road; the only trouble was that it didn't go far enough. A transfer point roughly fifteen hundred yards up the creek was established; here supplies were moved to sleds which were in turn winched up a steep, slippery slope. At the top of this home-made tramway, supplies were again transferred to trailers and towed forward as far as possible behind tractors. Indicative of the difficult terrain was the fact that it generally took a tractor with Athey trailer or sled seven or eight hours to travel the three miles between the top of the tramway and the eventual forward dump and to return over the same route.

Eventually deposited at a forward dump, supplies were then back-packed to the front lines. This latter phase toward the end of combat involved a considerable overland and uphill trek. Up one quite steep mountain side, for example, a human chain of engineers, 700 men long, hand-passed every bit of ammunition, food, clothing, and medical supplies to the men on top of the rim overlooking Chichigof Harbor.

On the other side of the island, in the Holtz Bay area, a couple of batteries of antiaircraft officers and men handled the labor detail. Mechanical equipment was entirely unfeasible; as a consequence those antiaircraft soldiers slaved for the three weeks of combat back-packing all supplies, without any satisfactory back-packing equipment. Their mission toward the end was one of hand-carry up an extremely steep, muddy, and snowy grade to the top of Chichigof Pass. Those men received little or no battle glory, but their determined effort kept the front-line troops just barely well enough supplied eventually to finish off the stubborn Jap, who was not satisfactorily supplied.

#### THE LANDING ON KISKA

The Kiska force was well equipped and understood the terrain and general conditions to a better degree than those who landed on Attu. There were consequently few exposure cases. For example, packboards were included as an item of issue. There is no more satisfactory means for the back-packing of ammunition, food, clothes, equipment, mortars, and machine guns than when strapped to a packboard. This item, long the trapper's and prospector's human pack saddle, proved its military usefulness beyond a question of a doubt in Kiska.

#### LESSONS LEARNED

Any experience, military or otherwise, has a definite value beyond the immediate objective attained. Operations in the Aleutians appear to the writer to have taught the following lessons among many others from the supply point of view:

1. It is very definitely necessary to choose clothing and equipment with extreme care for an operation in a cold region with difficult terrain. A task force operation, furthermore, requires the choice of a special list of clothing, not a complete T/E, for the mistake has too frequently been made of carrying along an item not needed whatsoever during an operation simply because a standard table calls for it. The Research and Development Branch has carried out considerable research on just what clothing and equipment is needed in any part of the globe at any season of the year, taking into consideration what should be eliminated as well as carried along. It stands ready to supply that information and see that the proper gear is supplied.

2. Training in the use and care of all clothing and equipment is necessary, but it is vital in a cold region, where unusual equipment is used. It is just as important to teach a man how to take care of himself and his equipment as it is how to fire some new type of weapon. Inadequate instructions in either case can and do result in unnecessary casualties.

3. Adequate supply personnel should be provided for the supply job. The supply team for such an amphibious operation should be as well and as smoothly organized and trained as an infantry regiment. It was frequently pointed out to the writer by officers of both the Attu and Kiska forces that amphibious maneuvers were never of long enough duration to allow re-supply, thereby giving the supply echelon no chance to test its plan of operations. Supply troops should be trained to operate under the conditions which they will eventually face in combat. They should not have to learn what sort of task they will face while striving to accomplish the job itself. If hand-carry will be necessary to a considerable degree, for example, the proper equipment for back-packing must be provided and the men trained in its use. This is particularly true of an amphibious operation in a part of the world where Nature itself presents a most formidable obstacle.

#### THE ALEUTIANS TODAY

Unless the Japanese choose to counterattack, ground combat operations in the Aleutians themselves are at an end. The Aleutians and the men occupying the bases there will lapse into obscurity. But there are thousands of soldiers up there who are fighting a war of supply against the most unpleasant of natural odds. It is true that in some of the older bases the job is no longer solely one of fighting for some degree of comfort alone. Remoteness is beginning to play a far more important role in that far-off front. Just as in countless other spots the world over where American troops are occupying the soil of some distant island, there are men up there who are fighting a lonely war devoid of the excitement of combat, and they are doing a very fine job of it.



# The Russian Army

[An article by Major J. V. Davidson-Houston, M.B.E., R.E., in *Journal of the Royal United Service Institution* (Great Britain) August 1943.]

COOPERATION between Allies has always been more difficult than between different arms or portions of the same forces, largely on account of mutual ignorance of each other's psychology and methods. This ignorance is especially pronounced in the case of ourselves and Soviet Russia, from which we have hitherto been separated by political and geographical considerations. The following notes, based on the writer's experience of liaison with the Soviet Army in Persia and on previous acquaintance with the country and its language, have therefore been compiled in the hope that they will be of interest, and perhaps of practical use, to British officers.

The population of the Soviet Union, amounting to approximately 175,000,000, is theoretically capable of placing some 18,000,000 men under arms, and in 1942 was able to oppose nearly 300 fully-equipped divisions to the Germans. In the naval sphere, Russia has always suffered from the disadvantage of having to divide her forces between her northern, Black Sea, and eastern waters, and she has become a great land power rather than a maritime one. The outlook of the average citizen, who in peace-time receives compulsory training in the Army on reaching the prescribed age, is that his country's defense is primarily a military problem; this naturally colors his views on Allied strategy.]

The U.S.S.R., like the British Empire, is made up of a number of constituents inhabited by people of various races. But there are far fewer social differences between the Soviet peoples than there are between, say, Australians and Indians, and an army unit may be composed of men from every part of the Union. Many languages are spoken and officially recognized, for the Government does not wish to emphasize the Russian preponderance, and the term "Soviet Union" was deliberately substituted for "Russian Empire." Russian, however, is the *lingua franca*, and those who cannot speak it are taught it in the Army.

Prior to the industrial revolution wrought by the Five Year Plans, the vast majority of the people were peasants; even now these form the greater part of the population, while the factory workers come mostly from peasant families. The Army, therefore, unlike that of Great Britain, consists largely of country-bred men, with the usual characteristics of hardness, stolidity, and simplicity. The soldier believes implicitly what Authority tells him, obeys orders without question, and is prepared to fight literally "to the last man and the last round" in defense of his soil.

After the Civil Wars, the Soviet Government had to form the Red Army practically from scratch. Owing to the unreliability of most of the former officers and the "liquidation" of the class from which they were largely drawn, it became necessary to draw on the proletariat for both officers and other ranks. By selecting the most suitable men and specializing their education at officers' schools, good officers have been produced. Those encountered have given the impression of keenness, seriousness, and a thorough knowledge of their own arm. The chief weaknesses, due in great measure to the lack of education and tradition in the past, were lack of initiative and ignorance of matters outside specialized duties. Hardly any of the officers met by the writer could understand a foreign tongue, and the few that could do so had wisely devoted their attention to German. Bolshevik propaganda had originally aimed at abolishing the authority and privileges of officers, and the word "officer" was expunged from the military vocabulary. The passing of the revolutionary period, together with war experience, have since brought about a gradual increase in the prestige of commanders. The orthodox titles have been reintroduced, and epaulettes have recently been adopted to distinguish them; even that check on the commander's authority, the Political Commissar, has been done away with. In short, it may be said that today the position of the Soviet officer, relative to the rank and file, differs in no material respect from that in other armies.

When the Red Army was first formed, Political Commissars were established at the headquarters of all formations and units down to platoons. They were members of the Communist Party and their main function was to ensure the political reliability of the commander and his subordinates. With this end in view, all orders were required to be countersigned by the Commissar of the formation or unit concerned, with obvious disadvantages. As the original reason for their existence became less essential, they began to take on the duties of Education, Welfare, and Public Relations. During the Persian operations they were the means of liaison between the Russian Army, the local inhabitants, the Soviet Embassy, and the British forces. At that time the undesirability of a virtual political department concerning itself in the command and administration of units, with the accompanying risk of mutual dislike and suspicion, was mitigated by assimilating the two branches and making officers interchangeable between them. The inevitable final step was

taken in October, 1942, when the abolition of Political Commissars was announced.

A study of the history of the Russian people gives the impression of a great, inert mass, stirred to its depth at widely separated intervals by some inspiring cause. The fight against the Tartars rallied all the Russians beneath the standard of the Prince of Muscovy: Alexander Nevski led an eager people against the Teuton menace; universal hatred of the Napoleonic invader was the cause of his disaster in 1812; history is now repeating itself. It is interesting to compare these campaigns with those in which successive Russian Governments have urged their people to acts of aggression. The Crimean War was the outcome of the Czar's ambitions in the Balkans and the Straits; the desire to control Manchuria and Korea led to the Russo-Japanese war; and Russia's part in the First World War was caused largely by political strategy which was ill-understood and little sympathized with by the masses. It emerges that the Russians do not fight with enthusiasm for any cause which is not readily comprehended by the people; for this reason the bugbear of the Indian North-West Frontier may be suspected of having clay feet.

Defense of its own soil, therefore, is the chief motive behind the energy and self-sacrifice displayed by a normally passive race. Its imagination, moreover, is roused by display and oratory to an extent foreign to the British. When a joint ceremonial parade was held in Teheran during the Winter of 1941-42, the British participants were surprised to observe that the Soviet cavalry carried their squadron and regimental standards and that their officers' chargers wore colored saddle-cloths embroidered with gold. Their units gave concerts which were enlivened by dances in native costumes, and a horse show was organized at which the ground was decorated with red screens sporting the portraits of Lenin and Stalin. These trappings had been carried into Persia by troops on active service, despite the fact that one of the regiments is known to have arrived without blankets owing to lack of the necessary transport.

Throughout the stern and drab years that followed the Revolution, the Red Army remained contented and loyal to the Soviet regime. It was, indeed, a privileged class. During the writer's brief tour of Siberia and Russia in the Autumn of 1938, he remarked that the men of the fighting services were well-paid, well-fed, well-clothed, and cheerful. They had their own shops, and their own restaurants and rest-rooms in many places. Their conditions of life compared favorably with those of other sections of the population. At the same time, it is a far cry from the Workers' and Soldiers' councils of the Revolutionary period. Discipline is now strict, and a superior's order is unquestioned. "Comrade-Colonel" is addressed from the position of attention and with the hand at the salute. The officer, for his part, is permitted none of the excesses nor negligences which

brought many of his Czarist predecessors into contempt.

One of the most potent causes of indiscipline in the former Army was drink. The Russian, especially in cold weather, is fond of vodka, and vodka contains a high proportion of raw spirit. In the Red Army, drink is strictly controlled, and the writer has never seen one of its soldiers drunk in public. During the occupation of Teheran, Soviet troops were not allowed to "walk out" in the town, and when one of our brigades entertained a party of Russian soldiers, the officer in charge confided that the "commanders" would be pleased to drink anything that was offered, but that the soldiers might drink only beer. Considerable apprehension was felt by the Persians at the prospect of a Russian occupation, owing to the memory of the excesses perpetrated in former invasions. In 1941, however, there were no well-founded allegations against the conduct of these troops.

Successive Russian Governments have discouraged the uncontrolled study of foreign countries and ideas and the unrestricted movement of foreigners in their territory. The natural results of this have been suspicion of foreigners and ignorance of the world outside the Soviet Union. An American engineer of the writer's acquaintance once visited an establishment at Vladivostock which was guarded by a sentry. After a short conversation between the sentry and the American's Russian guide, the latter explained that the soldier had asked the foreigner's nationality. When told that he was an American, the sentry exclaimed: "American? I did not know that they were white." This condition was again emphasized when a small column under the writer's command encountered a unit of the first Russian troops to enter Persia. A Soviet officer, after inquiring whether the British troops were part of the Persian Army, demanded why they had violated Persian neutrality.

This suspicion, however, has had considerable value in the enforcement of security measures. A country that was until recently divided against itself becomes security-minded, and in Russia silence is as golden as the penalty of indiscretion is leaden. Whereas the normally carefree Briton is apt to discuss openly any matter that is not specifically taboo, the Russian soldier is trained to refrain from talking on military subjects unless there is an adequate reason for doing so. The writer once dined with Lieutenant General Novikov, commanding the Soviet forces in Persia. One of the party was the General's female aide-de-camp; this lady would answer hardly any question even most remotely connected with the Army without a glance at the General and an assenting nod from him. The Russians in Persia showed great reserve on first meeting their new Allies, and British officers were not permitted to move freely in the area occupied by their troops. When General Wavell paid an official visit to a Soviet



cavalry regiment and one of his staff asked the number of horses on the establishment, the zealous commanding officer naively replied, "Many, many."

A day spent with a Russian cavalry regiment shows a few interesting differences from the British routine. Early stables were followed by a breakfast of tea, black, and *hasha* (a kind of porridge), and the rest of the morning was spent in uninterrupted training. The activities witnessed included horse exercise officers' riding school, physical training, lectures, and a great deal of drill. The physical training entailed work with apparatus in jacket, breeches, and boots; a lecture was given by a political officer on the reasons for the Anglo-Russian occupation of Persia, and individual soldiers were called upon to give the "correct" answers to questions; dismounted drill was executed by troops, each man being in marching order and carrying his rifle or automatic weapon. After mid-day stables, each section drew from the cookhouse a bucket of soup containing vegetables, meat, and pieces of black bread. There was no activity in the afternoon, but at about six o'clock the men began to indulge in such recreations as chess and the playing of musical instruments. Frequently a performance was given by the regimental entertainment unit, of which more anon. The last meal of the day is a supper of which the chief constituents are the inevitable tea and black bread. The Russian diet may seem monotonous to us, being largely composed of a two-pound ration of black bread; there is, however, no question but that it does not damage the hardy physique of the soldier. The writer remembers with amusement the horror of a party of British NCO instructors, detailed to hand over a consignment of tanks, when the first meal set before them by their hosts consisted of a bucket of soup into which they were expected to dip.

Recreation is dealt with on somewhat different lines from those pursued in the British Army. Russian garrisons are frequently situated at a great distance from any town, and it is accepted that the troops must depend upon their own resources for amusement. Each regiment therefore produces its own newspaper or magazine, and is accompanied wherever it goes by its entertainment unit, which includes a wireless loudspeaker and portable cinema. In addition, the regiment trains a troupe of singers and dancers, the quality of whose performance, due to the Russian theatrical flair, is very high indeed. While making due allowance for the difference in national tastes and characteristics, it is suggested that the morale of our own troops on active service or in lonely garrisons would be well maintained by organizing entertainment *within the brigade or battalion*. The necessary talent would never be wanting in the war-time composition of units.

The organization of the Russian Army follows the lines common to most armies, a characteristic feature being the division composed of three regi-

ments, each comprising three infantry battalions with a field and an antitank battery and other supporting arms. There is no corps organization, armies being sub-divided into a number of cavalry, tank, mountain, or infantry divisions.

The arms and equipment appear well-made and durable, and have stood the test of service. Russia, alone among the United Nations, had before the war organized an immense munitions industry, and her reserves of material were adequate for a first-class modern campaign. A characteristic of the uniform is its adaptation from the national costume. All ranks of all arms wear a serge blouse, gathered by a belt, with skirts that hang outside the breeches. These are baggy, and are tucked into black soft-leather kneeboots. The boots are easily slipped on and off, give protection from snow and damp, and are suitable for marching or riding. In addition, tank units are equipped with special helmets and overall suits. For cold weather, the men carry a soft, wool-lined or fur-lined cap with flaps that can be let down over the ears. For "dress" occasions a thin white blouse is worn over the other clothes. The troops in Persia had no hot-weather uniform, and the members of the Soviet Military Mission in Baghdad suffered such discomfort from the heat that they improvised costumes in Khaki drill with the help of a local tailor. Sun helmets are unknown, and a Russian officer, after examining one of ours, remarked quite seriously: "Surely these are not bullet-proof?"

The Russian Army possesses large cavalry forces for reasons exactly opposite to those which have unhorsed the British. Enormous reserves of horses and of men accustomed to them, the continued use of horses in civil life, and a terrain ill-provided with roads, have led to the retention and successful employment of horsed formations and animal-drawn first-line transport. The officer's charger is a long-legged, long-backed, awkward-looking animal, bred from English sires out of Danish mares, and his cross-country capacity and endurance are belied by his appearance. The troop and draught horses are of various breeds, largely Kirghiz, Turkoman, and from other Central Asian districts. Their hardiness and the standard of horsemastership may be measured from the fact that two cavalry divisions entered North Persia by cross-country tracks through the Caucasus, and that the units seen at Teheran showed very few cases of lameness and sore withers. Horses from the hard ground of the steppe country were shod only in front, and the hind feet did not suffer from the going. The men carry a rifle and bayonet in addition to a saber. Trick riding is popular, especially with the Cossacks, and the agility of the men is developed by gymnastic work in boots.

Mechanical maintenance, as might be expected in a recently industrialized country, was once the weakest link in the military chain; but keenness, exper-



ience, and hard work is rapidly raising the standard. Moreover, the reserves and expanding war industries have helped to make up for losses in vehicles and the western factory areas. An interesting antidote to the effects of cold weather is the practice of draining vehicles of lubricating oil when halted for the night; the oil is warmed and poured back before starting. The answer to the objection that starting is thus delayed, is that the delay might be much longer in starting from cold.

The artillery has always been a *corps d'elite* in Russia; it played an outstanding part at Borodino, in the Crimea, and in checking the German armor advancing on Stalingrad from the southwest. A considerable proportion, both field and regimental, is horsed.

The infantry, many of whom were in 1941 still armed with the old type of rifle and long triangular

bayonet, have been equipped with a self-loading rifle and a short, flat bayonet similar to our own. The ceremonial march-past is an impressive movement; the writer watched it executed in column of eights, each man carrying his rifle, with fixed bayonet, in a position suggesting the "on guard."

The impression given by the Soviet Union and its land forces is that of the creation, in an incredibly short time, of a first-class army from the ruins of an inefficient and ill-equipped one. Its peoples, having lived virtually under war conditions ever since the Revolution, have long been trained and ready to resist aggression. Its Government, alone among the United Nations, has profited by the lessons of the Far East and of Finland, and has been able to confront the Germans with an army comparable in numbers and material.

## Japanese Morale

[Extract from an article, "Return to Lae," in *The Times*, London, 23 September 1943.]

THE WITHDRAWAL of the Japanese remnant from Lae continues to be something of a mystery. The Japanese supply position was not good. But there was plenty of ammunition in the town, and even if there were no large dumps of food—natives report that they were destroyed by our bombing—there was a good deal of food about the place and the garrison was far from being starved. Admittedly Lae was of little positive use to the enemy. For many months past our air force has denied its use as an aerial base, and our pressure from the south and southwest has denied its use as a base for extensive land operations. But in view of the great advantages which Lae confers on the allies it is strange that the Japanese did not make more strenuous efforts to deny its use by us. . . .

This successful feat of allied arms will have widespread repercussions on the native peoples through New Guinea. They are people whose antagonism or cooperation is not a matter of indifference to us. Like all primitive peoples, their sympathies tend to be swayed by two things: innate respect for force and considerations of food. Already it has been noised abroad that "the white men have plenty of *kaikai* (food)," and these natives will now come over to us *en masse*.

Japanese resistance in this operation was not intense, and our entry into Lae was almost unopposed, but there was some fairly stiff fighting at certain points. The Markham Valley force was held up for one day in Heath's Plantation, where the Japanese fought stubbornly from weapon pits. The force coming along the coast from the east met stiff opposition on the western bank of the Busu, especially at Malahang anchorage. The commander of this coastal force is of the opinion that the Japanese put up quite a good show, but none to be compared with what the Germans would have put up.

The commander of a unit which had to cross the Busu River five miles north of the mouth says that a resolute party of Germans on the west bank might have delayed indefinitely the bridging of this turbulent stream and its crossing by large numbers of men. The general opinion among those officers and observers who went through the Papuan campaign is that the enemy's performance this time was very much poorer and that his morale seemed lower.

It is possible that this is the turning point in the war against Japan—not the turning point militarily so much as psychologically. Thus it might prove to be even more important. An enemy who has begun to think in terms of flight and defense is an enemy already half-beaten.

# The Assault of Fortified Positions

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THIS WAR has reached the stage where our enemies are on the defensive. More and more will it be necessary for us to attack strongly fortified defensive positions.

Much has been written about, and very careful studies have been made of, the methods employed by the Germans in their assault of such fortifications as Fort Eben-Emael and the Maginot Line. This German procedure is to a great extent the basis for our present official doctrine as expressed in FM 100-5. There is nothing wrong with this doctrine, provided we interpret it in the light of the type of fortified areas that we are going to run up against and the type of defense of these areas we will encounter. To explain. The French considered their Maginot Line to be impregnable. Their strategy was based on the principle of passive defense. The Germans, on the other hand, do not consider any fortified area to be impregnable. They use their fortifications as a defensive means in order to free large bodies of troops for offensive action elsewhere. That offensive action will be in part in the form of a counterattack at the point where we are trying to break through their defense. In other words, they expect their fortifications to give, but they also expect those fortifications to put up enough resistance so that by the time we penetrate even a short distance, we are so slowed down and exhausted that we can be easily driven back by a counterattack. Therefore, our doctrine must be interpreted with this idea in mind.

Why is it necessary for us to consider this problem of assault operations? If we can possibly avoid it, we don't want to assault any such fortifications. We want to avoid them. But consider the facts. We know that the coast of France is heavily fortified. The Germans are fortifying the approaches through Italy and the Balkans. Behind much of that is the West Wall. Elsewhere in Europe will be fortifications—individual villages, important road intersections, the far banks of rivers—all will be fortified. Some form of assault operations will be required of our troops wherever we go; so specialized training for this work must be given to all of our troops, and some units must also receive the additional training which is necessary to break through fortified areas such as the West Wall.

It is believed that there are four essential elements which are necessary in order to attack successfully any fortified position. These are:

1. Complete knowledge of enemy installations and doctrine.
2. Thorough training of selected men under competent leadership and unified command.

3. Availability of excellent equipment and thorough coordination in its use.

4. Air and ground superiority.

Let us consider these points in detail to see why they are so important.

First, complete knowledge of enemy installations and doctrine. Another way of saying this is "reconnaissance and intelligence." You must know all the information of the enemy that it is possible to obtain. Here are two illustrations, both taken from German experiences. The first is the story of Verdun in the last war. The Germans planned to place a tremendous artillery concentration on the stone forts of Verdun and reduce them to rubble. They believed that after this preparation all their infantry would have to do would be to walk in and occupy the position. So convinced were they that the artillery preparation would do all the work that they didn't bother to try to find out what the French would do. Fortunately for the French, at about this time they (the French) had become very much concerned over the value of permanent fortifications—remembering Liege and others—against heavy artillery, so they moved a great portion of their troops out of the heavy forts around Verdun and put them to work preparing and occupying field fortifications—trenches, machine gun emplacements, and the like—all behind barbed-wire entanglements. In addition, they moved up a substantial amount of light artillery, and placed it in mobile field positions. The Germans succeeded in smashing up the forts to quite an extent, but most of the French weren't in them. And when the German infantry confidently advanced, they were met by withering rifle, machine-gun, and artillery fire from the French who were in position in the wood and fields outside.

In the second instance, that of Sevastapol in this war, the Germans did not make this mistake. For weeks before the assault on Sevastapol actually started the Germans made exceedingly careful and painstaking reconnaissance of the Russian positions. They photographed and rephotographed the entire area, sent patrols out to locate the forward positions, and in every possible manner obtained complete information about the enemy. Then, although the assault was preceded by what has been said to be an even more intense artillery bombardment than that at Verdun, each man knew almost exactly what he could expect to find as he advanced.

From these two examples you can realize the necessity for *complete* reconnaissance. Verdun held, Sevastapol fell.

The second point is that of thorough training of selected men. It is easy to say that the men shall be trained, but let us look at this a little closer. Each man involved in the ground part of the assault must of course be given his basic training, with particular emphasis on scouting and patrolling. Following this, each man must be given training in his specialized job. For example, the artillery will need training in moving up assault artillery to forward positions from which they can take the fortifications under direct aimed fire. Engineers will have to receive additional training in the use of bangalore torpedoes and other charges under conditions of assault. Following this, the various small groups will have to be trained in working together. For example, imagine an assault detachment working forward to destroy a pill-box while at the same time direct fire artillery is shooting at that same pill-box and supporting riflemen are covering the advance by shooting at this main target and any other targets which may appear. Do you believe this can be done smoothly and without casualties caused by our own fire unless these groups have trained together under these same conditions?

As to the question of unified command, you can readily see how such an operation might easily fail completely if there were not one man responsible for coordinating all parts of the team. And don't forget that replacements must be trained—somebody must decide when they should be sent into the action.

This leads to the third point—the availability of excellent equipment and thorough coordination in its use. The availability of equipment is obvious, but its coordination is an important problem. As I have just mentioned, training is part of the answer. Following this, there must be careful and detailed planning for the entire operation. Plans must be made for coordination between the weapons of the artillery and of the assault troops, between those of the air forces and of the assault troops, between those of the engineer and infantry elements of the assault troops. There must also be coordination in the use of smoke. And the whole must be tied together. Much depends upon adequate signal communication during the operation, and this problem must be very carefully worked out.

And finally, there is the question of air and ground superiority. The Germans know how to make the best possible use of their fortifications and their defense will be as bitter and determined as was that of the Russians at Sevastapol. High morale and excellent leadership and execution on our part will not be enough.

This leads to the question, "What are we doing about it?" We do have plans. They are not fully developed, but we are not blindly copying the Germans. We are developing a technique based on our doctrine and the type of defense we know we will

run up against, and using the weapons and tools we now have developed and are developing.

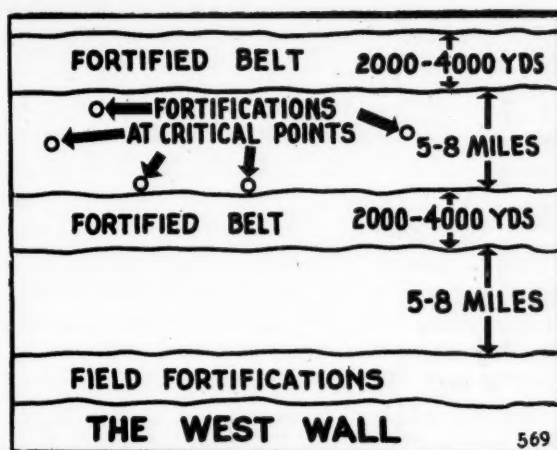


FIGURE 1.

Figure 1 shows a typical section of the West Wall. Behind a zone of field fortifications, including trenches, weapon emplacements, barbed wire, and other obstacles, the Germans left a "buffer" zone five to eight miles in depth. Then comes the first of two fortified turrets armed with machine guns and heavier guns—all mutually self-supporting. These emplacements are protected across the front of the belt by antitank obstacles and thick bands of barbed wire. Between the two fortified belts is a second "buffer" zone in which there are fortifications at critical points.

Figure 2 shows in more detail a section of one of these fortified belts. It shows the antitank obstacle, behind that the two thick bands of barbed wire, and behind that the emplacements. The arrows indicate the principal direction of fire. The rectangular figure

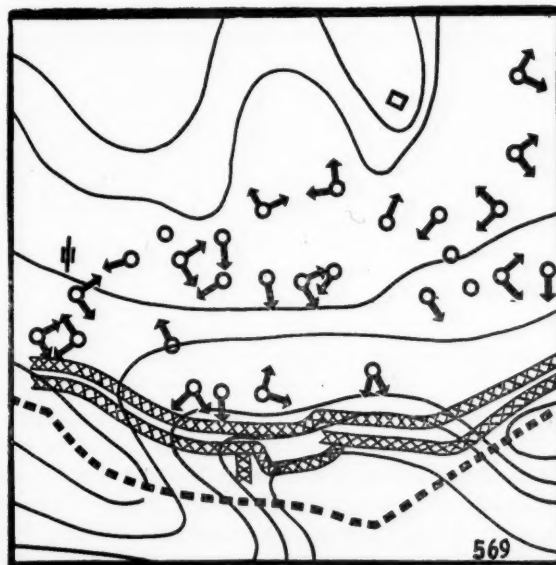


FIGURE 2.

represents an emplacement for the shelter of troops who would leave this shelter, after our artillery prep-



aration, to counterattack and drive back our assault detachments.

Plans have been made for the reduction of such a belt. Of course this plan must be tested and will be improved and revised, but it is a beginning. Each infantry division in training in this country is now spending time in small-unit training in assault operations.

However, there is much that can be done by each infantry division over and beyond the small-unit training. Consider the tremendous problem of reorganizing and training an entire division for such an operation. Consider the vast amount of staff planning which is necessary to coordinate the actions of perhaps twenty or thirty assault detachments forward simultaneously, each needing support from artillery, infantry, chemical troops, and each other. Consider the additional support the division

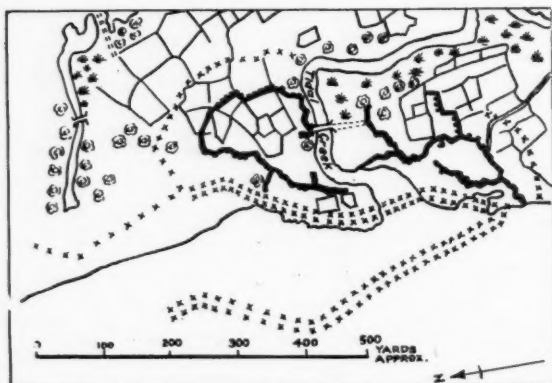
will need in the way of artillery, engineers, signal troops, and others. Consider the problem of the use of aviation in connection with such an attack. Consider the type of opposition you are going to encounter. Remember this: The Germans are not going to sit back passively, content with their present plans and set-up. They are continually working to improve their defenses and their defense plans. We must think ahead and work out new ideas to overcome them.

Finally, remember coordination. This is an operation where engineers, infantry, artillery, chemical units, signal troops, the air forces, and tank destroyer units all must work closely and smoothly together. This calls for the highest degree of coordination. It means unified command, careful and detailed planning and preparation, and smoothly meshed execution. Without all this such an operation has no hope of success.

## A Typical Beach Defense Position in Burma

[From War Information Circular (India) reprinted in *Army Training Memorandum (War) (Australia)*, No. 22, April 1943.]

THE DIAGRAM below shows in detail a typical beach defense position which the Japanese have constructed, and are still constructing, in Burma. It is a trench system within wire defenses.



The trench system consists of two groups enclosing irregular areas and separated by a tidal creek. The trenches are approximately five feet wide at the top and have firing bays projecting outwards from them, thus affording an all-round field of fire. The trenches zig-zag irregularly, and the fire bays are spaced at intervals varying between 23 and 70 feet.

There are about 66 bays, equally divided between the two groups.

The only defensive structure within the trench system is a pill box, about ten feet square, within the northern of the two areas. Between this pill box and the river a large tree has been felled to obtain a clear line of sight.

A single line of wire, set on posts at approximately ten-foot intervals, encloses the two trench systems on the north and south. On the landward side the tidal creek is used as a boundary to the locality without wire defenses along it.

Along the foreshore wire has been laid in double lines, ten feet apart and in shallow zig-zags, joining at the north and south to the single lines of wire described in the preceding paragraph. A single line of wire in shallow zig-zags continues the foreshore defenses northwards along a sandy beach for about 300 yards. The overall width of the defenses enclosed by wire is about 600 yards; its depth about 250 yards.

A forward double line of wire runs northwards through shallow tidal water from the southern end of the double line on the foreshore for about 550 yards to a point 200 yards forward of the position.

# The Air Transport Command

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THE AIR Transport Command is fighting its first war and improvising as it goes along.

Militarily the Command has been in much the same position as a flier setting out on an unknown course. Considered in its entirety, the United States Army Air Forces have at least the experiences of World War I as an inheritance upon which to draw. The infantry and artillery have generations of tradition behind them and shelves of textbooks ready to hand. The Air Transport Command is fashioning its own traditions now, day by day, and the writers of its textbooks and well-rounded history must await more leisurely times.

Even if the facts were assembled, military secrecy would forbid the telling of by far the greater part of the Air Transport Command's operations. These operations bear such strategic significance that their disclosure would be of great assistance to the enemy. It would permit him to forecast the shape and intensity of things to come. So this sketch of the Command's place in the war picture must be confined to rather general terms, though its setup and mission may be clearly presented.

Not long ago the War Department announced that Distinguished Flying Crosses had been awarded to thirty-five pilots of the Air Transport Command, Army Air Forces. None of these men bombed Tokyo nor Berlin. None took a Thunderbolt or Lockheed Lightning into action against the foe. They had just flown—which, in a manner of speaking, describes the mission of the ATC. It just flies, and keeps on flying.

Each man of the thirty-five pilots was decorated after logging more than a thousand hours aloft. Among them, they rolled up the equivalent in flying time of four solid years. One of these pilots made twenty flights to the Far East and criss-crossed Africa to the extent of 350,000 miles. Another, in the course of his thousand hours, managed to rescue nine P-40 fighter pilots forced down in the desert. Again, he lashed a spare wing to the under-carriage of his transport and delivered the wing to a disabled plane 1300 miles away.

This is the work of the Command, more grueling than glamorous.

About the best the ATC can say for itself in the matter of age is that it came into being a short while before Pearl Harbor, specifically, on 29 May 1941. Under the name of Ferrying Command, which was discarded in July 1942, the ATC was organized after President Roosevelt directed the Secretary of War to assume the responsibility for delivering aircraft for the United Kingdom. In its directive, the White

House charged the War Department to keep planes flowing from American aircraft factories to their points of take-off from the United States. The late Major General Robert Olds, then a colonel, was chosen to undertake the job.

First headquarters of the ATC was a single basement room in the Munitions Building, Washington, and the staff consisted of two officers and a clerk. Today, the Command's military personnel alone approaches six figures.

The first ferrying order was issued 7 June 1941, and two days later a pilot winged away from a factory with the first newly built aircraft ever delivered by the Command. By November 1941 more than a thousand planes had been ferried. Meanwhile, a North Atlantic route had been opened and African routes had been carefully surveyed.

In September 1941 the Harriman mission left Washington for Moscow in two B-24's piloted by ATC officers and a Navy PBV. From England some of the party proceeded by boat, but Captain (now Colonel) A. J. Harvey and Lieutenant (now Lieutenant Colonel) Louis T. Reichers, pilots of the B-24's, kept on to Moscow. Their journey has been touched on by Quentin Reynolds in his book, *Only the Stars are Neutral*, but in the furor of greater events the record-breaking nature of their flight, certain details of which are still secret, have been generally overlooked.

Continuing from Moscow, Harvey circled the globe in a 27,000-mile flight, returning to Washington by way of Singapore, Fort Darwin, Port Moresby, Wake Island, and Hawaii. Reichers came home by way of Cairo, thence across Africa and the South Atlantic to Brazil. Both flights involved risks that would have been foolhardy in normal times. They took their Liberator Expresses into strange airfields and bored ahead without briefing, weather information, or adequate maps. The pair more or less set the pace for thousands of ATC men who came after them. Though the ATC is not a combat Command, the list of its officers and men who have been cited is impressive. Perhaps Harvey and Reichers are in part responsible.

With Pearl Harbor, the Command came of age almost overnight. There was more to be done than ferrying planes to take-off points within the continental United States and transporting occasional military and diplomatic missions. Before long, the Command could say that it had flown more ton-mileage in one month than was flown by all the domestic airlines of this country during 1941, biggest year of their peacetime operation. Men and matériel had to

be gotten places in a hurry and the job of doing it fell to the ATC and its Navy counterpart, the Naval Air Transport Service.

The mission of the ATC may be set forth as follows:

1. Ferrying of all U. S. Army aircraft to the fighting fronts, together with Lend-Lease deliveries.
2. Transportation by air of personnel, matériel, mail, strategic materials, and other cargoes for all War Department agencies (except those served by the Troop Carrier Command) and for any Government agency of the United States or Governments of the United Nations.
3. Control, maintenance, and operation of air bases along foreign ATC routes.
4. Utilization to the fullest extent possible, both within and without the United States, of the services, facilities, and personnel of the civil air carriers.
5. Provision of assistance for movements overseas of combat units.
6. Administration of priorities for air travel and movement of cargoes on aircraft operated by or under contract to the ATC, and on civil air carriers.

This would have been a big order even for a Command which had all the machinery ready to whirl, and a trained force large enough to handle the machinery. The ATC had neither the machinery nor the men. It had to set up the machinery and obtain, then train, most of the men.

The private airlines of the nation proved a lifesaver. Much of their flight and ground personnel was absorbed into the Command, and the greater part of their business in the United States passed under contract to ATC. As for their overseas lines, it was found necessary to militarize these to a very great degree. Contract carriers in foreign operations include Pan-American, TWA, Western, American, Eastern, Northwest, Northeast, United, Braniff Airways, and Consolidated Aircraft.

As now constituted, the Command consists of headquarters in Washington (more specifically Gravelly Point, Virginia, adjoining the National Airport); the Ferrying Division, with headquarters in Cincinnati, Ohio; the Domestic Transportation Division, with headquarters at 33 Pine Street, New York City, and eight Foreign Wings.

The Ferrying Division handles all domestic ferrying of planes and all training operations. When ferrying crews reach areas under jurisdiction of the various Wings, they pass under control of the Wing; but on completion of their missions they return to the Ferrying Division bases for further orders.

In passing, it might be said that the prize goal of every ferrying pilot is to receive Class Five rating which signifies he is qualified to deliver any type of aircraft, big or small, bomber or fighter, monomotor or multi-motor.

The Domestic Transportation Division, as its name implies, confines itself to air transport on the home front.

The eight Foreign Wings are as follows: Pacific, India China, Africa-Middle East, European, North Atlantic, South Atlantic, Caribbean, and Alaskan. Routes branch forth from the United States into each of these wings, marked off on the world map. Each Wing is commanded by a general officer who is responsible for all air transport and ferrying within his boundaries as well as the maintenance of bases, and weather and communications systems within his domain. As new territory is wrested from the Axis, the air routes in one Wing or another lengthen. Thus, Sicily and then the Italian mainland come within the orbit of ATC operations.

At this point it may be well to make clear the lines of demarcation which separate the ATC from two of its brother Commands, the Troop Carrier Command and the Air Service Command.

Both the Troop Carrier Command and the ATC run what one might call a taxicab, trucking, and towing service, but they do business in somewhat different spheres. Units of the Troop Carrier Command are attached to various theaters of operation for local, tactical service as the need requires. ATC supplies the theaters on a relatively regular schedule, carrying out long range delivery.

To illustrate, the ATC tows gliders to delivery points; the Troop Carrier Command tows them into action. The ATC flew last-minute items across the Atlantic for the invasion of North Africa; the Troop Carrier Command flew paratroopers down from England to take part in the invasion.

The Air Service Command furnishes supplies for all Army Air Forces aircraft throughout the world, and repairs and rebuilds them. It prepares all American and Lend-Lease planes for ferrying or shipment overseas by surface vessel. It packs and loads all air freight flown within the United States by the ATC, its function here being not unlike that of a railway express agency. Outside the United States, however, in the Foreign Wing, the ATC must do all its own loading, a task which in some remote parts where equipment is scanty has given rise to new techniques in the lashing and stowage of difficult cargo. But, wherever the ATC carries on its aerial trucking business at home or abroad—the Air Service Command stands ready to give what one might call garage service at all hours of the day and night. The men of that Command keep ATC planes flying, and without their skilled cooperation it would be impossible to carry on.

Civilian airlines aim at achieving safety, comfort of the traveler, and maintenance of schedules, in that order. Safety likewise heads the list in the calculations of the ATC, but comfort is out. Any reader of this article who has been the "bucket seat" guest of the Command on a hop across the Atlantic or a



long inter-island journey down toward the South Pacific undoubtedly will testify that comfort was indeed very much out. But safety retains its prime importance because the plane load of combat crews who fail to reach their destination will never bring down any Zeros and the ferried bomber which cracks up en route will never blow out the walls of a Nazi factory.

The emphasis on safety, with maintenance of schedules in second place, has paid dividends. Crashes and casualties are bound to occur, but the fight to prevent them is an unceasing one. During the four months ending 31 January 1943 the ATC flew more than 4,000,000 miles in Africa and carried 21,300 passengers without injury to a passenger or loss of a plane. During 1942, 99.7 percent of all planes accepted for delivery both within and without the United States reached their destinations safely. No plane has been lost on the perilous Pacific routes due to enemy action, though the Japs have tried more than once to interfere.

Left to their own inclinations, a good many of the ferrying pilots would set out to smash a few time records. They are not encouraged to join in such contests because it would take too much out of a new ship's engines before it arrived at the front. It is felt that more haste can be gained at less cost to fighting ships by closely coordinating the return of ferrying pilots to the United States where they can begin a fresh delivery.

Late in September 1943, ferrying crews set a record by delivering eight Flying Fortresses to England and returning to their home stations in this country, all within four and a half days. The Fortresses were put down in England, fully equipped for combat except for taking on their load of bombs. The home stations of some of these crews were located well inland from the Atlantic coast. Consequently their round trip within four and a half days embraced considerably more than merely two crossings of the North Atlantic. They had little time in the United Kingdom to keep any dates with girl friends. In fact, they piled into C-54's for the return flight about as soon as they had gotten signed receipts for their delivered Fortresses. The point is that good traffic management rather than stretching the engines of the Fortresses cut the time to four and a half days.

In April 1943 the War Department disclosed that single-seated fighter planes as well as bombers were crossing the ocean under their own power to tackle the enemy. The first trans-Atlantic ferry flight of fighters involved the movement of a number of P-38's, running well into three figures. Only one ship was lost at sea. It is common practice now for an experienced ATC crew in a multi-motored plane to convoy a bevy of fighters, flown by relatively new pilots, across as much as 1600 miles of ocean. In the case of bombers, the figures may move up to 2400 miles.

Communications play a most important part in

such operations. The leader is continually being fed information covering the weather, and it is his job to shepherd the fledglings through any heavy going that may blow up en route. The matter of "homing" on the lead ship has been worked out successfully and inter-plane communications "keep the family together" as they beat their way toward the combat zone.

Some time ago, an old timer of the ATC—old in experience if not in years—was leading a convoy of twin-motored light bombers overseas. He was flying a four-motored ship and was about 500 miles short of the island base where they were to let down when one young pilot reported his starboard motor smoking. Next, it began to miss. Finally, his agitated voice reported it was out completely. Wise in the ways of trans-oceanic flying, the old timer literally "talked the lad in." He kept up a running fire of conversation with him over the inter-plane hookup and sandwiched in a message to the island control tower to make ready to land a limping bomber without delay. The lad brought his bomber in on its one good engine. He brought in something else besides—a lot of invaluable experience in handling a difficult situation and a bracing confidence in his ability to buck the gremlins.

In the early days of the war, things were rather strenuous for some ATC men. One pilot left Washington the Saturday before Pearl Harbor, flying Ambassador Bullitt to Cairo. This same pilot wound up ninety-four days later in Melbourne, Australia, with 580 hours on the engines of his Liberator Express. He had Christmas breakfast at Basra and spent New Year's Eve with the Royal Australian Air Force at Townsville. His missions were many but certainly not monotonous. He flew loads of machine-gun ammunition and three-inch antiaircraft shells. He flew General Wavell, Brett, Hurley, and Brereton, with various members of their staffs, on urgent journeys about the South Pacific front. He evacuated plane loads from points of enemy attack in the Dutch East Indies and flew missions over Burma, always keeping an eye out for the Jap Air Force. The pilot himself finally got back to his starting point in Washington on the last day of March 1942, but General Brett insisted that he leave his faithful Liberator in Australia for further duty. His might well be characterized as "The Long Flight."

Another ATC pilot, questioned on the score of fast flights, replied: "Well, I remember buying some Danish pastry in Iceland one day and having it for dinner that same night in Washington. We made pretty good time on that particular run."

Sick and wounded have been flown from Karachi, India, to Walter Reed Hospital, Washington, something like 13,000 miles, in five days. Thousands of wounded have been transported in ATC planes.

Last January General MacArthur messaged that

he was running short of hand grenades in the Solomons. At ten o'clock in the evening a Colonel of Ordnance rang up one of the ATC's traffic and priority officers at his home in Washington and, in general terms, dumped the problem into his lap. The Colonel then dispatched a messenger to the officer's house to show him General MacArthur's message. The priorities and traffic officer swung into action and caught three transport planes on the fly. Two were ordered to unload their cargoes; the third was being ferried empty to the West Coast. All three were directed to proceed with all speed to the Ogden, Utah, ordnance depot, load with hand grenades, and head for Hamilton Field, California. The staff of the ordnance depot stood by for the night to handle the

loading at whatever hour the ships might arrive. By eleven o'clock the next morning the last of the three planes had set down at Hamilton Field. There, two long-range C-87's were fueled and waiting to be trans-loaded for the arduous flight down across the Pacific with 11,000 pounds of grenades. Both had cleared Hamilton by three o'clock that afternoon and three days later they were in Australia. The situation was so pressing that General MacArthur ordered both C-87's to go forward with their cargoes directly to the Solomons, and final delivery to the Japs came in good time.

This was one mission where ATC men didn't spare the engines.

## Seagoing Quartermasters

[Extract from an article in *The Quartermaster Review* September-October 1943.]

ONE OF the Army's unique yet little known outfits is the Quartermaster Boat Company, Aviation, a part of the Army Service Forces. Its mission is rescuing of aircraft personnel forced down in water areas, and salvaging equipment when it doesn't jeopardize the lives of the rescue crew. Surprising as it may be to find sailors in the Quartermaster Corps, they operate rescue boats, crash boats, and salvage boats in connection with Air Corps activities. In addition to being trained fighting men on land, these soldiers are chosen because they also have experience on the water and in the operation of power craft.

Equipment includes rescue boats, derrick boats, gas and water tank barges, and target boats. The wide variety of watercraft operated by these companies includes boats as small as 16 feet and as large as 120 feet in length. Shallow draft swamp gliders are used to operate in areas where all other types of boat would be grounded.

Men who form the crews have a wide background of maritime experience, which is supplemented by special training. Disciplined soldiers with seagoing experience, these men study maritime as well as military subjects during their training period at the special school operated by the Army Air Forces.

Training is accomplished in two phases. First, there is the theoretical or classroom instruction for twelve weeks, with forty-eight hours of instruction each week. Then the men take what they have learned and put it to practical use in actual work on rescue boats at sea. There is one course for officers,

one for boatswains (who are noncommissioned officers), and one for deckhands.

A knowledge of first aid, life-saving in the water, and fire fighting techniques are "musts" for the men trained for this outfit. Since their first job is to rescue fliers from planes that have crashed, they are trained to recognize aircraft designs so that they know how many crew members each type of plane carries and where in the plane each may be found. Occupying positions of responsibility, these men are familiar with ship routine and administration as well as Army administration methods.

The men learn to use and care for a large number of weapons of different types. They are also trained in the use and handling of explosives, and they know what to do in case of a gas attack. This is a part of their military training, in which they also learn infantry drill.

Instruction is given in identification of our own and of enemy planes. The men study the design of planes so that, in the split seconds that may mean the difference between life and death for trapped members of the crew of a wrecked plane, the rescue crew will make every moment count.

When a plane crashes in shallow water and the crew has been rescued, salvage operations are begun if it has been decided that the risk incurred by the personnel of the salvage crew is not too great. If a plane is so badly wrecked that salvage is impossible, or if capture is imminent, the rescue crews are instructed to take immediate action in destroying equipment which could be of value to the enemy.

# The Proof of the Pudding

Testing United States Infantry Doctrine in Tunisia

LIEUTENANT COLONEL BYRON L. PAIGE, *Coast Artillery Corps*

THE TIME-WORN statement that "the proof of the pudding is in the eating" has its counterpart in war, where we can say with the same tolerance for variations in recipes, "The test of doctrine is success in battle."

In Tunisia our standard recipes for success in battle, as set forth in Field Service Regulations and the minor manuals, were tested. As with puddings, it was found that radical departures from standard recipes usually resulted in failures, whereas by following the cookbook even our inexperienced chefs found they could make pretty fair pudding.

However, as they began to rediscover the functions of the various ingredients of battle, they began also to master the technique of adjusting recipes for a hot oven and for changes in barometric pressure.

Tucked away in paragraph 920 of FSR, in the section devoted to "Mountain Operations," is this recipe: "Within its terrain compartment, each tactical group makes its *main effort* along the crests and slopes or by a combined advance along the heights and valleys. It is particularly important that early possession of the heights on each side of the defile assure protection to the troops operating within the defile."

One of the lessons learned in Tunisia was that this recipe is not limited to mountain warfare nor peculiar to it, but is applicable wherever hills and valleys form terrain compartments. Our forces found that "in order to advance successfully, troops had to avoid natural corridors of approach, which were invariably mined and heavily defended, and work along the ridges and high terrain features. In this way the enemy was forced to abandon strongly defended positions at the heads of corridors, valleys, and natural approaches." "To advance along valleys was disastrous. Taking to the ridges was tedious, strenuous business, but it saved hundreds of lives and gave us physical possession of the high ground. Four times this resulted in the collapse of strong positions. . ."

This, while conforming to FSR on mountain operations, at first glance seems to contradict the doctrine of attack as outlined elsewhere in FSR and in Appendix II of FM 101-5. Actually, however, there is no specific contradiction, although apparently the recipe as written elsewhere got a number of inexperienced cooks into trouble. For instance, the whole discussion of boundaries in the attack in Appendix II of FM 101-5 gives the impression that the main effort is made in the center of the corridor. It doesn't say so, but the average reader would so interpret it.

Here the lesson to be learned on the basis of combat experience is that while corridors into the enemy

position do favor the attacker by limiting the lateral fields of fire, and while boundaries between units in attack should still follow the crests, the technique of utilizing corridors should be to capture the sides of the ridges. If concealment in the center of the corridor is such as to mask completely the maneuver of infantry, then penetration up the corridor under such concealment may be the quickest way to flank the slopes and reduce enemy positions thereon. If such concealment does not exist in the corridor it is clearly not sound tactics to penetrate between ridges still held by the enemy. As long as enemy observation of movement in the corridor is possible, artillery and mortar fire from areas outside the corridor as well as from the corridor itself can make any movement in force very costly. If concealment does not exist, or is inadequate, attack along the ridges is clearly indicated.

Here the problem eventually resolved itself to the question of control of observation. Of all the lessons learned in Tunisia, this was the most clear-cut and definite: *control of observation is often the decisive element in battle.*

Throughout FSR the importance of observation is stressed, but what is not brought out is its often *decisive* effect on operations. Observation, it is true, is listed as one of the points to be checked and considered in analyzing terrain. But in Tunisia it was found that instead of being merely a means to an end, control of observation was often the decisive element, and might well be considered the primary mission of an attack.

For instance: indecisive action had continued for ten days in the El Guettar area, until finally our forces captured a hill from which the Germans had been observing the battlefield. Almost immediately the whole German defense of the area crumbled and they withdrew—not so much from the effect of American fire actually directed from this hill as from their realization that the change in control of dominant observation was decisive.

The lesson to be learned here is only a shift in emphasis, but the realization of the decisive possibilities of control of observation may affect the choice of objectives for attack and may aid in the concentration of effort at the decisive point. In Tunisia, "seizure of dominant terrain features as intermediate and final objectives became the core of infantry commanders' plans. *Specific effort to capture key points for artillery observation posts was emphasized. . .*"

Our forces soon found, however, that occupation of these key terrain features or the capture of them



from the Germans presented new problems not specifically covered in FSR. Jerry was invariably prepared to deliver artillery concentrations on positions he had vacated and on all prominent crests and elevations. "In the attack on ———, advance elements stood up on the skyline instead of continuing down the forward slope and digging in. Artillery fire came down almost immediately, causing many more casualties than were suffered in taking the position." The lesson here is not only that it is unhealthy to stand up on the skyline, but that where possible any grouping of troops on or near prominent crests, landmarks, or captured positions must be avoided, for the Germans habitually prepare artillery fire for all such points.

FSR states (paragraph 554): "Artillery and air observers search for probable assembly areas of hostile reserves so that enemy preparation for counter-attack may be broken up by artillery fire and air attack. If the attack is unable to make further progress, the captured terrain is organized for defense and held until the attack can be continued."

Experience in Tunisia showed, however, that infantry elements cannot depend too heavily on the complete repulse of enemy counterattacks by artillery fire and air attack. "The Germans invariably launch an immediate counterattack to regain lost ground, and precede such attack with prepared artillery fire. Advancing units had to take immediate measures for the organization of captured ground for defense." Such measures should be taken so far as possible *as the attack progresses*, since cessation of the advance may only result from the counter-attack itself, at which time it is a little late to start thinking about defensive measures. In the attack all supporting weapons should be employed in such a manner as to facilitate their being switched to defensive fires if the advance be terminated by counter-attack, and planning for such defensive fires must be concurrent with the advance. In this connection, some distribution in depth of all heavy and automatic weapons was found to be essential in the attack as well as in the defense.

In the organization of positions for defense or against counterattack our forces found that the habitual occupation of forward slopes was costly and often ineffective. They learned from the Germans to occupy reverse slopes in defense, with shorter fields of fire, but with prepared artillery and mortar fires laid on the crests in front. This change appeared to many to be a startling innovation. And it was, when viewed in the light of the stereotyped forward slope defense commonly employed in training exercises.

But it was not startling, not new, in the light of FSR on defense. To quote (paragraph 606): "Consideration of concealment may, however, make it desirable to select a reverse slope. *Such a location is*

*practicable when possession of the crest to the front is not essential to the observation of artillery fire.*"

That is the key. The experience of our troops in Tunisia was that the reverse slope position was tactically superior, but such positions can be taken only where observation from other ground is assured.

In the matter of tanks as employed with infantry, there appears to be a divergence between FSR and the experience of our troops in Tunisia. This divergence, however, is simply a matter of interpretation and degree. FSR states (paragraph 1147): "... Tanks should not be tied too closely to foot troops. If so restricted, their mobility is sacrificed and they become a vulnerable target for antitank weapons."

In spite of this doctrine, however, experience in Tunisia—and it has been borne out in later operations—was that "infantry support has been indispensable to the tank action, especially in consolidating the ground overrun by tanks." It was found that "their employment should follow the principles of cooperation, teamwork, and coordination required for the infantry-artillery team."

This experience should of course be analyzed in terms of the terrain over which the Tunisian campaign was fought. It is probably safe to say that the more broken the terrain, the closer the degree of cooperation necessary between infantry and tanks. In this connection it is interesting to note that the Germans, long advocates of massed armor, in Tunisia habitually employed tanks in small groups working closely with infantry, although where terrain favored tank action they were quick to mass them in greater numbers and to use them with greater flexibility.

In spite of some divergences, due largely to modifications made necessary by local conditions, our basic doctrine was found to be remarkably sound, considering the tremendous development of new techniques of warfare during our years of peace. It is a tribute to the judgment and wisdom of our military leaders that drastic revisions have not been necessary. Our most serious shortcomings are not in the lack of sound doctrine but in the misapplication of that doctrine under the stress of combat.

For instance, FSR states (paragraph 553): "... Under cover of the supporting fire, the assault unit advances close to its objective. When the supporting fires are lifted from the objective the assault unit overruns the hostile resistance in a single rush. Any delay in launching the assault after the fires lift allows the enemy to man his defenses."

This seems clear-cut enough. Yet in Tunisia, "in early action the infantry often allowed artillery concentrations to lift so that 500 yards or more had to be traversed before closing with the enemy. This al-

lowed the German to come up out of his dugout and recover from the effect of the artillery and man his weapons. As a result our attack was often repulsed with heavy losses."

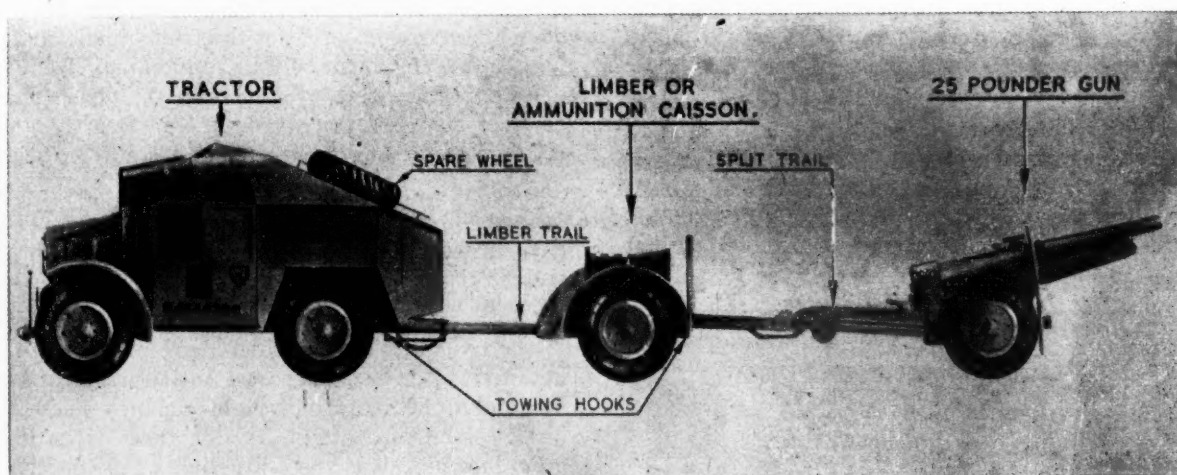
Later, however, at —, "the —th Infantry stormed the hill following the artillery at 100 yards. They took only three casualties from our artillery and overran the position with the bayonet before the defenders had recovered and manned their guns. No

casualties were suffered other than the three mentioned above."

In general, this experience is typical of our development into a smoothly functioning, efficient fighting team. It isn't what we don't know, but what we don't apply that causes reverses on the battlefield. Our problem is principally one of training men to make intelligent use of the soundest basic doctrine possessed by any army.

## The British 25-pounder Field Howitzer

[From an article in *The Sphere* (London) 27 March 1943.]



ONE of the best all-round field guns of its kind in the world is the British 25-pounder field howitzer. It has shelled tanks at forty yards range and enemy positions eight miles away with equal effectiveness. Weighing about a ton and three-quarters, costing nearly £3,000 (\$12,000), it is made with such precision that its own crew can virtually rebuild the gun in the dark, in the desert, anywhere, replacing worn or damaged parts with new, using only the tools that each crew carries with them.

The normal gun crew consists of five men, but the gun can be, and often has been, worked by one man alone in case of necessity. It has a range of elevation to forty-five degrees. The barrel is about seven feet long from breech to muzzle, and on firing it may recoil as much as forty inches. The "recuperator" or shock absorber on which the barrel is operated contains a three-cylinder, oil-dampened, compressed-air device, and at the end of the recoil the pressures in the recuperator may rise to 2,000 pounds per square inch. The rather thin-looking shield which protects the crew is actually a piece of very high-quality armor plate which has withstood penetration when fired on at ranges as close as 200 yards.

The complete outfit really consists of three units: the gun tractor, which is a very short-wheel-base lorry with a high ground clearance; the limber; and the gun. The tractor is a totally enclosed vehicle, known in the British Army as a "quad," which has a speed of forty miles per hour and can negotiate rough ground very nearly as well as a tank. Hitched to a towing hook at the rear of the "quad" is the gun limber, and hitched to this, in turn, is the gun itself, which is always towed tail first. The gun can go into action within a few seconds after the "quad" has halted. It is little more than a matter of knocking open the two quick-release hooks on the towing gear, and the gun can be fired on its wheels as soon as it is brought to bear.

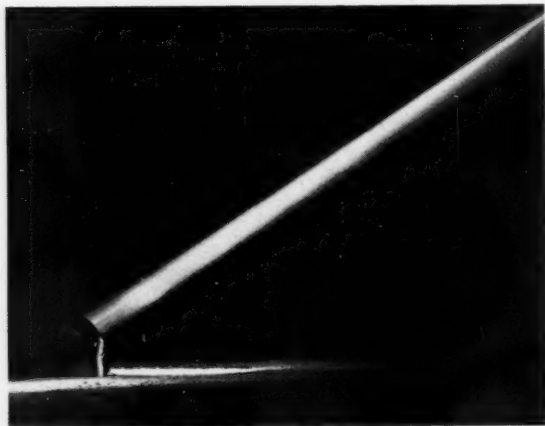
Mounted on the limber will usually be seen the camouflage nets and the circular steel firing platform. Although the 25-pounder's trail gives it a very wide arc of fire, it is still often not wide enough for modern war. The stock method of German tanks when attacking a gun position is to make attacks from the flank or even from the rear. By mounting the gun on a steel table, one man can quite easily slew it around on its own pivot, and the gun has an arc of fire all around the compass.

# Tactical Employment of Antiaircraft Searchlights

Prepared under the direction of the Commandant, AAA School, Camp Davis, N. C., by  
MAJOR JAMES A. SCOTT, JR., AND CAPTAIN HINKLE MCLENDON, JR.

**S**EARCHLIGHTS (alias "Moonlight Cavalry," alias "Smoothbore Artillery," as they're often affectionately called) are coming into their own in the antiaircraft artillery problem. One factor which has brought this revival about probably more than any other is the extensive use of fighter aircraft for night operations in the present war. Searchlights are now cooperating with the Air Forces through the medium of the fighter-searchlight team, as well as furnishing illumination for the antiaircraft guns. They are being used to illuminate enemy bombers in order that our friendly fighter planes may close in for the attack.

Before we go any farther let's look into the mission of these oversized flashlights. By definition, the mission of searchlight units is to discover and illuminate hostile targets (normally bombers and observation planes) operating during darkness in order that these targets may be effectively engaged by antiair-



craft artillery or friendly fighter aviation. A further mission assigned to antiaircraft artillery searchlight units, which is not directly connected with their ability to illuminate targets, is to provide a continuous Antiaircraft Artillery Intelligence Service (AAAIS) for close-in, accurate warning purposes.

In carrying out their normal mission, searchlights perform another important function. Whenever a searchlight beam is turned on an airplane, the dazzle effect makes it more difficult for the plane to accomplish its mission. In fact, when caught in the apex of any appreciable number of beams, it becomes virtually impossible to do precision bombing.

Initially, fire by antiaircraft artillery against enemy aircraft required visual tracking. This requirement necessitated illumination of aircraft at night

to provide this visual tracking and the antiaircraft searchlight was born. At this time direction finding was by sound location until the plane was picked up, after which the searchlight controller tracked the target visually. A steady improvement was made in supplementary equipment to improve both the pick-up and subsequent tracking of the target. Effective operation at this time was dependent in a great measure on those weather and climatic conditions that affect normal vision. Illumination for the purpose of ground observation was impossible during fogs, low-flying mists, clouds, and rains. Many of these obstacles were overcome by the development of other methods which greatly enhanced the accuracy and precision of searchlight operation.

Now searchlights can track and often provide sufficient illumination of enemy planes flying above haze, broken clouds, or a thin overcast to permit attack by friendly fighter aviation when ground observation is impossible.

The basic mission as stated above provides for illumination for two purposes, antiaircraft artillery fire, and attack by friendly fighter planes. These will be discussed separately although there is no basic difference as far as the searchlights are concerned. In any searchlight employment, two considerations are basic:

1. There is no essential difference between the illumination of targets for antiaircraft gun fire or for attack by fighters, and a searchlight defense, once organized with the requirements of both antiaircraft guns and fighters in view, with the personnel trained in the few, simple, special requirements of illumination for fighter cooperation, can furnish fully adequate illumination for either.
2. In any area defense comprising several defended objectives within a few miles of each other, all searchlights in the area should be integrated into a single, coordinated blanket defense, under a single searchlight group commander, to the great advantage of overall effectiveness.

## THE FIGHTER-SEARCHLIGHT TEAM

The fighter-searchlight team was developed to take advantage, at night, of the great fire power and tactical mobility of fighter aircraft. The searchlights locate and illuminate the enemy planes, even when flying above haze, broken clouds, or a thin overcast, so that they can be effectively engaged by the friendly fighters.



## TACTICAL EMPLOYMENT OF ANTI-AIRCRAFT SEARCHLIGHTS

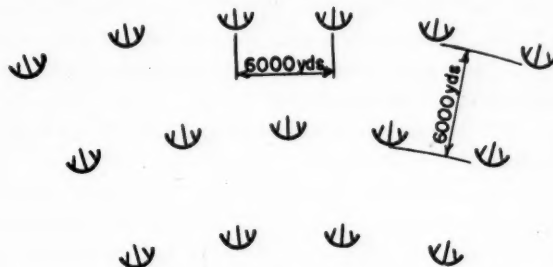
To make full use of the capabilities of fighter aviation in combating enemy night air raids, certain basic requirements must be met. Advance warning of the approach of an enemy attack is imperative in order that our friendly fighters will have time to leave the ground, climb to the enemy's altitude, and close to the interception and attack. Continuous illumination of the target for a sufficient length of time to permit the fighter pilot to proceed to the point of interception and press home an attack. This requires a uniform disposition of the lights in an all-around defense in order that no spots exist that cannot be illuminated. A major proportion of all hostile airplanes in multiple wave or formation attack must be illuminated. Illumination of the hostile airplanes must be such as will facilitate attack by the friendly fighter. It must not hinder the attack by blinding the fighter pilot, nor necessitate his entering the illuminated zone about the target when he closes in to effective range. Illumination of the friendly fighter through error must be avoided.

Most critical of all is the requirement that the friendly fighters remain always inside the outer boundaries of the searchlight area until an intersection of two or more searchlight beams has been formed on or near the target. Therefore, it is necessary that all parts of the searchlight area be of regular shape, and the area sufficiently large in all dimensions to allow orbiting friendly fighters a high degree of probability of being able to remain inside its boundary at all times.

The number of beams required for illumination of a single target depends upon several factors. Illumination must be sufficient to enable the fighter pilot to locate the target, proceed to the point of intersection, and press home the attack. It should be provided in such a manner that it in no way interferes with the fighter as he makes the attack. The fighter pilot does not have to see the target itself in order to locate it. If he can see the intersection, that will be all he needs to direct him to the target. As he approaches the intersection, the illuminated target will become visible to him. The illumination produced by two beams will normally be sufficient for the fighter pilot. As more and more beams are directed at the target, the apex of the cone of lights becomes coarser and coarser, with a larger ball of light being built up around the target. This condition may reach the point at which the fighter pilot will have to fly into the illuminated zone around the target in order to close to effective range. This would have the adverse effect of not only blinding the fighter pilot, but also illuminating his plane so that it becomes an easy target for the rear gunner in the enemy plane. In some instances, it may be necessary to use more than two beams as in the case of well camouflaged planes at high altitudes or under conditions of poor visibility.

To meet the requirements listed above the layout of the searchlights must be homogenous, closely knit,

and as regular as possible in shape. In a searchlight defense consisting of one or more battalions for fighter cooperation, either alone or in combination with a gun defense, searchlights are disposed on concentric curves in an area defense extending uniformly as far out from the objectives in all directions as availability of equipment permits. Normal spacing



is approximately 6,000 yards between adjacent lights in a given row and approximately 6,000 yards between adjacent rows (see sketch). The distance between searchlights depends, of course, upon the terrain and visibility conditions of the area in which the defense is located and the expected altitude of attack but will seldom be greater than 6,000 yards.

When a majority of attacks are to be expected at extremely low altitudes, this spacing may be reduced to the extent necessary to provide continuous carry. Even in comparatively flat country, the interference of normal terrain features may prevent continuous carry when a spacing of 6,000 yards or greater is employed.

Where the defended objective is located in the immediate vicinity of the seacoast, spacings between lights along the coastal side of the defense must be reduced to compensate for the inability to secure outward extension of the defense to seaward.

The final disposition of the searchlights on the ground, while approaching the normal interval, depends on the terrain features encountered.

For cooperation with fighters, a minimum of one searchlight battalion is required. One battalion can provide a minimum defense for a single point objective. Fighter-searchlight defenses are usually assigned to larger or multiple objectives requiring two or more battalions. For a normal single objective, small seaport, or city with a vital area approximately five miles in diameter, a minimum of two battalions is required.

When two or more searchlight battalions are employed in the defense of an area, they are organized as a searchlight group with the group commander responsible for its establishment and operation.

The design of a searchlight defense involves the application of the general principles to the extent that local conditions, such as availability of equipment and terrain features, will allow. The following principles are adhered to as closely as local conditions permit:

1. The depth of the searchlight area is never less than ten miles from the outer row of lights to the defended objective. This depth is increased up to twenty-five miles whenever availability of equipment and terrain permit.

2. Normal spacing is used. Naturally terrain will require that spacing between some lights be materially greater than between others.

3. The searchlights are distributed as evenly as the terrain features permit, except where lights are deliberately concentrated.

4. The shape of the searchlight area is as regular as the terrain features permit.

5. Control points for the fighter planes are located within the searchlight area in sufficient numbers and at the proper locations to give complete coverage.

A continuous belt of searchlights intended for fighter cooperation is sometimes employed. Such a belt has application only where fighter aviation is operating in *general defense* as opposed to *local defense*. The belt should be approximately twenty-five miles square. A line of control points for fighters is established along its outer boundary, parallel to and a suitable distance inside. If necessary, a second line of control points may be established forward of the rear boundary. Where many objectives lie comparatively close together in the interior of an area, it is possible, with the aid of the Aircraft Warning Service (AWS), to employ fighter aviation to its greatest advantage. By suitably disposing and operating it along the frontier, it is possible to give a measure of defense to all objectives in rear of the line of fighter operation. This makes most effective use of the outstanding advantage of fighter aviation, its tactical mobility, and constitutes the most effective manner of employment of fighter aviation.

#### EMPLOYMENT WITH GUNS

In certain cases anti-aircraft searchlights in numbers less than one battalion will be employed in the defense of single isolated objectives. The searchlights in these cases are normally placed in concentric circles about the objective. The defense must be capable of acting effectively against attacks from any direction. Such a result will be obtained by the uniform distribution of sufficient lights around the objective. However, accidents of terrain, particularly the presence of large water areas, may make such a distribution difficult or even impossible. The effective slant range of searchlights is dependent on conditions of visibility, and may vary between wide limits. Under favorable conditions of visibility, the slant range is from eight to ten miles, but under poor conditions of visibility the range may be much less. Tactical disposition, therefore, must conform to the conditions of visibility prevailing.

The searchlight defense must be able to illuminate the target in sufficient time to permit the gun batteries to deliver fire against the target at the maxi-

mum effective range of the guns. The defense set up by less than one battalion will normally consist of two concentric rings of lights. The searchlights on the outer ring are the pick-up lights, and those on the inner ring are the carry lights. For satisfactory gun battery operation, it is necessary to carry the target with at least two lights. Different conditions of visibility and attacks delivered at extremely high altitudes might in some situations require three or more beams to carry a single target. The hostile target is carried until either the target is destroyed, the target crosses the objective, or the target changes course, turns away from the objective, and passes beyond the extreme range of searchlights and guns.

#### SPREAD BEAM SEARCHLIGHTS

In some cases searchlights will be employed with a wide beam instead of the usual narrow long-range beam. The spread beam will normally be employed in the illumination of low-flying targets for engagement by automatic weapons. Additional uses are illumination for defense against airborne troops, illumination of landing strips or airdromes, illumination for defense against water-borne attacks and landings, and illumination of hostile low-flying enemy aviation for interception by friendly fighter aircraft. When the objective being defended is within an area containing a normal searchlight defense, the disposition of lights for spread beam illumination must be coordinated with the general plan of searchlight defense. This will permit some lights to be placed so that they can be used either for spread beam or normal illumination.

It must be emphasized that the range of illumination decreases as the beam is spread. Therefore, in order that maximum range may be obtained, the narrow long-range beam should be used except in those cases where the angular rate of travel of the target is too great, and where close-range targets over a relatively large area must be illuminated.

Occasionally the spread beam may be used to form a glare barrage cover over a relatively small area, such as an industrial plant or a railway center. To form the glare barrage, a limited number of lights with the beams spread should be dispersed throughout the area and elevated to positions approximately vertical. This will assist in screening from aerial observation a ground installation which is not completely blacked out or which may be readily recognized because of an outstanding geographical feature.

#### THE ANTI-AIRCRAFT ARTILLERY INTELLIGENCE SERVICE

The distinction between the Aircraft Warning Service (AWS) and the AAAIS should be understood. The AWS is a Signal Corps operated service to provide long distance warning for a large area. AAAIS is concerned only with detection and location of targets that are approaching a particular defense.

and operates down to individual fire units. The smallest link in the AAAIS is the air guard at each fire unit who maintains a constant watch for sneak raiders.

The responsibility of furnishing and operating an AAAIS is assigned to the searchlight defense when one is present. Where no searchlight defense exists, the other antiaircraft artillery units must organize and operate an AAAIS.

The importance of a properly functioning intelligence service is apparent when one considers the speed of enemy planes and the short period of time that they are within an antiaircraft artillery defense. Unless all elements of the defense are alerted and ready to open fire immediately, the enemy planes can approach, carry out their mission, and be gone before the defense can function.

The searchlight defense is better able to supply advance information of the approach of enemy planes. Any information of approaching aircraft is immediately transmitted to a central operations room where the course of the target or targets is plotted and the proper elements of the defense are alerted.

#### ASSIGNMENT OF SEARCHLIGHT UNITS

As is the case with other types of AAA equipment, no definite statement can be made as to the number of searchlight units that are normally assigned to units of the field forces. Each situation requires a thorough analysis of all requirements upon which is based the assignment. A general statement can be made that seldom is antiaircraft searchlight protection assigned to the division or corps. For defense commands and other forces such as overseas possessions, bases, theaters of operation, and zones of the interior, searchlights are provided as required by the mission.

#### CONCLUSION

The development of searchlights is continuous, and additional uses are frequently being found for this exceedingly versatile weapon. For example, many friendly planes which might otherwise have been lost when returning from a mission have been guided directly and safely to a friendly base by the use of searchlights as homing beacons. With the constant improvement in technique and accuracy, it can be expected that the antiaircraft searchlight will continue as one of the mainstays of antiaircraft defense.

## Protection Against Cold in Russia

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Spanish article by Captain V. J. Sanchez, Spanish Army Medical Corps, in *Ejercito* (Spain) June 1943. Captain Sanchez served with the Volunteer Spanish Division in Russia.]

DURING the first period after the drop in temperature, means of protection were insufficient, and since our soldiers did not attach any great importance to the new conditions, cases of local frostbite occurred. Various improvised methods were adopted to provide protection against the cold.

The feet were wrapped in pieces of newspaper placed between two pairs of socks inside the boots. This proved to be highly effective. If there was sufficient space in the boots, straw was used instead of paper.

Each sentinel's period of duty was reduced to a minimum, lasting from fifteen to thirty minutes if the man had to stand still, and a longer time if he was required to walk or if he was engaged in some kind of work.

The use of alcohol was absolutely prohibited before or during the period of duty, and it was used only under supervision when the assignment had been finished and the man had returned to his quarters.

A special type of footwear was employed consisting of a colossal boot with a wooden sole several centimeters in thickness, worn over the ordinary boots and fastened with straps. Later, boots of a similar type were issued but of a lighter construction to take the place of ordinary boots where mobility was required and where the "super-boot" gave rise to difficulties.

A grave difficulty was experienced at all times on account of the sudden change in temperature which the soldier experienced when entering and leaving his quarters. The quarters constructed during the winter were wonderfully suited for habitation and were all heated with stoves burning wood, of which there was a great abundance. In order to avoid the harmful effect of the difference in temperature, soldiers remaining in quarters during the periods of rest wore the least possible amount of clothing, the thorax being bare and the boots off. At times, the soldiers, especially the Germans, wore only their undergarments.



# The Staff in Modern War

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article by Colonel M. Gretsov, Soviet Army, in *Izvestia*, Moscow, 9 May 1943.]

THE SCOPE of warfare today demands the accumulation of colossal masses of men and matériel distributed in theaters of action thousands of kilometers in extent. In some battles the density of concentration of troops is sometimes so great that on a sector 10 of 12 kilometers in width there are more than a hundred guns and about 50 to 60 tanks to each kilometer [ $\frac{5}{8}$  of a mile]. At precisely designated moments these guns hurl large quantities of shells. At a previously determined time the tanks move to the attack. Punctually on the minute, and sometimes even on the second, planes appear in the sky. At the appointed moment tens of thousands of troops, firmly united by a single will, rush to the assault. With all this, the role of the army staffs, the organs of command of the armies, has grown as never before.

The staff is called upon to organize the mass of men operating the most complicated matériel in such a way that no one hinders anyone else, so that each complements the other, and so that all together, by organized cooperation, they solve the general problem set by the commander.

The work of the staff of today demands, first of all, a consideration of the time factor. Characterizing the Stakhanov movement [speed-up method in Soviet industry], Stalin said that the Stakhanovists had learned to count time not only by minutes but even by seconds; that the Stakhanovists had learned to value the time factor in work. In war Stalin's statement concerning time must serve as the inviolable law of the command. Suvorov said that "in war, money is precious, human life more precious, and time is the most precious factor of all."

Of what use is the most powerful tank attack if it is ten minutes late? Within this time the enemy, if he has strong reserves available, can smother the attack of the most heroic infantry. If our pursuit planes are only three minutes late, a great number of bombs may be dropped on the heads of our troops. It is the task of the staff to calculate accurately the time of action of all types of troops.

The modern staff must deal with time literally as with a precious commodity.

In the time estimate, everyone from commander to soldier is assigned a strictly defined limit beyond which he has no right to spend a minute. The nature of the conduct of war does not brook capricious relationship to time. The order goes through channels: from army to corps, from corps to division, from division to regiment, from regiment to battalion, and

from there to the company. And in each of these units, in each subdivision of these units, time is required for the organization and conduct of the operation. The skilful commander tries to take as little as possible of the time assigned to him and to give as much time as possible to his subordinate troops and officers.

The majority of officers of the Soviet Army, educated on the principles of the Stalin strategy, on the principles of the Bolshevik leadership of the masses, showed their ability to operate with the time factor in the Civil War (1918-1921). The classical example of calculation of time occurred in the greatest operation of all wars—the Stalingrad operation. The thrust, accurately calculated as to time, to isolate and surround the Stalingrad group of enemy forces, and the carefully calculated and, from the point of view of time, brilliantly executed maneuver of reserves of the Soviet High Command in the liquidation of the German forces encircled at Kotelnikovo, trying to break through to Stalingrad, proved to be the fundamental success both of the command of the troops and the methodical conduct of the whole operation.

The ability to estimate time gives to the commander and, which is especially important, to his subordinates, great confidence in the operation.

But it is not enough to determine exact time limits and to calculate time beforehand. The skilful command of troops demands the fulfillment of the commander's orders within the prescribed time limits. From the moment that the commander makes the decision the intense, detailed work of the entire staff organization begins.

Delivery of orders to the troops is a very important operation. One instance is known from experience in which the order of the corps headquarters was sent by three means: radio, plane, and automobile. By none of these did the order reach the commander who was to execute it. The order sent by radio was so distorted by the radio operator that it was impossible to decipher it, and the advantage in speed was lost. The plane did not arrive—it was brought down by a hostile fighter. And the armored car got lost in a snowstorm. Only by a fourth means, an ordinary horse and cart farsightedly provided for by the commander, was the order delivered.

Where the work of the staff is highly developed, control is exercised directly on the field of battle. Staff officers go to the battlefield for this purpose. Invested with the full authority of their commander,

these staff officers adjust difficulties on the spot. With their wise counsel they help subordinate officers correct this or that inaccuracy. Control is of particular importance when the troops accomplish a field movement. At night, in the woods, or on strange roads, when it is very difficult to be oriented in the movements of large bodies of troops, especially sharp vigilance is necessary to see that each commander brings his men at the indicated time to the point assigned to him.

Command of troops is unthinkable without constant, uninterruptedly active reconnaissance. In our time the idea of "intelligence" has been raised to the level of scientific knowledge. It would be incorrect to understand intelligence as merely the collection of information about the enemy. The fundamental task of intelligence is to determine the intention and plans of the enemy, to foresee his maneuvers, and to warn friendly troops in time so that countermeasures may be taken.

In each headquarters there are special officers of the intelligence service. In their work they are directly connected with the commander. At the disposal of contemporary intelligence is a large arsenal of means: air, artillery, tank, cavalry, and infantry reconnaissance, observation with the aid of long-distance optical apparatus, and interrogation of prisoners. In order that all these means may work continuously and may constantly furnish essential information to the commander, the work of the officers of the intelligence staff must be precise, systematic, and calculated to the minute. Well-organized intelligence is a sign of dependable command of troops.

One of the most complicated fields of work of the contemporary army staff is that of communications. Modern technique affords many good, reliable means of communication: telephone, telegraph, radio, plane, automobile. At the start of an operation, during the preparatory period, all this is usually present in abundance. But with the beginning of fighting many of these means of communication are put out of order. This greatly complicates the work of the staffs in the command of troops. Combat practice indicates that in our age of radio and electricity it is often impossible to disregard such a simple but, under conditions of bad weather, dependable means of communication as a messenger on horseback or even on foot, particularly when operations have a mobile character.

One of the most important problems of the staff is the care of the reserves. The careful, skilful commander constantly accumulates reserves and the staff continually watches their availability and training. The staff keeps constant check on its forces.

This tally is not expressed simply as statistics or as a bare total of infantry, cavalry, and armored forces. Its essence is a qualitative evaluation of the troops. In order that the commander, in making a decision, may correctly dispose and direct his forces, he must be thoroughly familiar with the troops under him. A skilful staff is of invaluable aid to the commander in this respect. During combat the make-up of companies, battalions, and regiments is constantly changing. Part of the force is unavoidably lost, and goes to the rear as sick and wounded or is destroyed on the battlefield. New forces in the form of reinforcements come up from the rear. The problem is not only to estimate precisely and rigorously each man and each machine coming to the battlefield, but also to study constantly the nature of the combat strength of the given battalion or regiment. There cannot be two completely identical battalions, much less identical divisions. Even if numerically equal they frequently have sharp differences in combat strength and abilities with which it is the duty of the commander and especially of his staff to be familiar. One division is made up of men who have never been in battle; in another there are few such men. An instance is known in history when one unit was ordered to cross a stream at night and it turned out that not one of the soldiers or officers of this unit knew how to swim. Combat abilities must be estimated every day and must be precisely calculated for each engagement.

Contemporary military organisms, large and small, are so constructed that they must live and fight strictly according to plan. On the field of combat, just as under conditions of peacetime instruction, the heart of the plan is the mind and will of the commander. The commander with the aid of his staff works out the plan of battle, calculating when, where, and which enemy units must be annihilated, how and where the enemy will try to counterattack, where and when it is necessary to dispose our troops, what reserves are necessary, how to organize intelligence agencies and what material means to provide for combat.

The commander is obliged to demand from his staff incessant creative work on the composition of plans, and especially of the plan of battle. Then no activities of the enemy will be unexpected. When the commander and his staff are always occupied with creative work both in the sphere of intelligence and in the study of their own troops and of the terrain, calculating time to the minute and to the second, then their troops will always feel confident and reassured. And this results in the firm and resolute conduct of the troops in battle.

# Essentials of Motor Maintenance in the Field

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THE IMPORTANCE of mobility as a vital element of success in combat is a well recognized principle of war. In modern warfare a unit's mobility is largely determined by the quality and quantity of its motor vehicles. As the battlefield is to a large degree isolated from the source of supply during combat, the quantity and quality of motor vehicles thereon depends on the unit's ability to conserve the vehicles at hand, that is, on motor maintenance.

The fact that some commanders realize the importance of motor maintenance is indicated by a report from Africa of a 500-mile march across very difficult desert terrain which was made by a division in four days without the loss of one of its 3,000-odd vehicles. However, other reports from the same campaign indicate that this understanding was not universal. For example, one officer reports that his vehicle inspection of two divisions which had performed identical previous service indicated that 25% of the vehicles of one division were unfit for the proposed operation, while more than 90% of the other division's vehicles were not qualified. These and numerous other reports indicate the marked effect that motor maintenance exerts on the tactical planning.

The purpose of this article is to present those basic facts which every officer should understand relative to the administration and operation of motor maintenance.

The mission of motor maintenance is to maintain the vehicles at their proper numerical strength and highest operating efficiency. What factors do we have to contend with to fulfil this mission in the field? First, the motor vehicles are scattered out over a large area. The 1400-odd vehicles of a single infantry division may be scattered out over its area which may exceed 200 square miles. Secondly, the vehicular breakdown rates will vary considerably from time to time in the various localities which make up the theater, due to the constant changes in the tactical situation. The third and fourth factors which must be considered are weather and terrain which may vary for a given force from operation in an arid desert, to a frigid mountain top, then back to a jungle swamp, all within a relatively small area. Economy of matériel must be practiced, as our national resources are not boundless and our resupply cargo capacity is limited. Then too there is that other fleeting element that is always pitted against us—time.

How does the Army overcome these adverse conditions? By the establishment of a motor maintenance

system which operates on the following principles:

1. Motor maintenance is a function of command.
2. All motor vehicle operators and mechanics must be excellent drivers and soldiers.
3. Preventive maintenance service (PMS) is vital and must be performed meticulously at all times.
4. Mechanics, tools, equipment, and parts must be made available where and when required.
5. Replacement unit assemblies must be used to conserve time and skill.
6. Recovery, evacuation, and reclamation of matériel must be carried out as an economy measure.

Now let us consider these fundamentals in more detail. *Motor maintenance is a function of command.* Motor vehicles have become of such tactical importance that all commanders are personally responsible for their proper maintenance. In the discharge of this duty, the commander must formulate plans and assign duties, and supervise their execution. Stated in the words of an experienced officer, a commander should assign a permanent driver to each vehicle, assign definite maintenance tasks to be performed at specified periods by designated personnel, and stress constant thorough supervision of maintenance by junior officers. Field experience indicates that officers must actually get into and under vehicles in performing this duty.

The desirability of complying with the *second principle*, that is, that *motor vehicle operators must be excellent drivers and mechanics*, is self evident. The driver, who is with his vehicle more than anyone else, can conserve or abuse it. Also the mechanics are dependent upon the driver's ability to report minor defects early, before they develop to the extent that a major overhaul is required. Excellent drivers don't just appear. They are secured by *careful selection, thorough training, and constant supervision*.

Driver selectees should have good judgment, be alert, dependable, and healthy, and have excellent resistance to fatigue. They must have normal vision, hearing, and reaction time. In addition to having the proper aptitudes, prospective drivers should have the proper attitude. They must realize their responsibilities. Temperamental, egotistical, or "show-off" drivers should not be tolerated. War Department Technical Manual 21-300 (Driver Selection and Training) outlines a driver's selection testing technique which should be regarded as a minimum standard. It consists of an interview, a series of tests to determine physical and mental fitness, and a written examination. The fact that a candidate suc-



## ESSENTIALS OF MOTOR MAINTENANCE IN THE FIELD

cessfully passes this test does not mean he will make a good driver. However, any individual who fails to pass the driver's aptitude test should be immediately rejected from driver training. The difficulty observed in the field is not that candidates are not tested, as this is mandatory, but that the results of the tests are often ignored. Such action has been reflected in the organizational vehicle disability records in every case.

This same manual (TM 21-300) also outlines a driver training program, which is rather detailed as to points to be covered but does not specify the amount of time to be placed on each subject or on the course as a whole, as it recognizes the fact that this is dependent on local conditions. It is gratifying to note that 82% of the time is recommended for practical instruction and only 18% for demonstrations, lectures, and discussions.

However, when our drivers have been given their final examination and road test and are issued their operator's permit, our job as unit commanders is not completed. Driver supervision is the next step. It is the duty of every officer and noncommissioned officer in the chain of command to supervise constantly the activities of his drivers.

Up to this point we have considered only the technical training of the motor vehicle driver. As no individual can perform a creditable task if he is constantly worried about his daily existence, all drivers and maintenance personnel should be trained in combat duties as soldiers. Only after they have mastered such subjects as weapons and field techniques will mechanics and drivers have sufficient confidence in their ability to survive on the battlefield to permit them to apply themselves unreservedly to their basic functions, maintenance and driving.

The mechanics and drivers must be taught field expedients. They should not be permitted to use tools or maintenance practices during the training period that they cannot carry with them to the field. They must know the best methods of recovery on the battlefield of our own and enemy equipment. And of course they should be taught the dangers of booby traps.

Another very important subject which should be driven home to all driver and maintenance personnel is the proper methods of destruction of matériel which is in danger of falling into enemy hands. Unless *uniform* methods of destruction are practiced the enemy will be able to build a few serviceable vehicles from the many disabled vehicles on the field. Proper methods of destruction are described in War Department Training Circulars (TC 5 and 18, 1943).

Now let us go to, our *third principle*, *Preventive Maintenance Service (PMS) must be performed at all times*. PMS is based on the doctrine that by careful operation, frequent inspection and adjustment, and regular lubrication and servicing, a vehicle may be kept in operation. Figure 1 indicates the various PMS, their scope, and who is responsible for their proper execution. A very important point to note is that the driver accompanies the mechanics and technical personnel during the performance of these services in order to indicate defects, assist the mechanic, and learn more about his vehicle.

The question may naturally arise as to how we keep track of the scheduling of all these services. A file is maintained for each vehicle, in which the record of the latest monthly, semi-annual, and technical inspection is maintained (WD, AGO Form 461, etc.). However, to give the overall picture, the War Department has prescribed the use of the Duty Roster

PREVENTIVE MAINTENANCE SERVICES

Type	When Performed	Performed By	Scope or Purpose
Before Operation *	Before each operation	Driver	To insure that conditions are unchanged since last PMS (leaks, etc.)
During Operation *	Continuously while driving	Driver	To detect improper performance and correct prior to breakdown
At Halt *	At each halt	Driver	To correct defects noted, to prevent subsequent "fall out"
After Operation *	After each operation	Driver	To correct deficiencies and prepare vehicle for immediate operation
Weekly	Weekly	Driver; inspected by chief of section and company officer	To tighten, check up, lubricate, and clean vehicle
Monthly (1000 mile)	1/20 each day	Unit mechanics	Lubrication, inspection, and correction of entire vehicle
Semi-annual (6000 mile)	1/26 each week	Unit mechanics	Same as preceding, though more detailed
Technical Inspection	10% each 6 months	Ordnance maintenance personnel	Random check of vehicle's serviceability, and quality of unit maintenance service
Command Inspection	Any time	Commanding officer or representative	Check of vehicle and equipment; also quality of driver and mechanic PMS

\*Minimum "battlefield maintenance"; should never be entirely omitted even in extreme tactical situations.

FIGURE 1.

**DUTY ROSTER (WD, AGO FORM No. 6) USED TO KEEP RECORD OF MOTOR VEHICLE  
MAINTENANCE OPERATIONS**

**NOTES:**

**Legend:**

**A—Deadlined on account of accident**

### O—Deadlined in ordnance shop

P—Deadlined for lack of parts

(WD, AGO Form 6). The use of this form is illustrated in Figure 2. It will be noted that the heading of the roster is modified to read "Motor Vehicle PM Roster," and that it is a monthly record. All vehicles of the unit are listed by WD registration numbers, grouped by vehicle type, in the column to the left of the guard roster, and the various services performed are shown in the appropriate blocks opposite. The meaning of the various symbols is indicated in the legend. The four digit figures indicate the mileage of the vehicle at the time of service. The circling of a symbol indicates that this service was performed at other than the normal time. By this means a unit commander can check on the status of the PMS of his unit at a glance. This knowledge plus his visual inspections of the vehicles gives him an excellent picture of how his drivers and mechanics are assisting him in the discharge of his maintenance responsibility.

However, no matter how motor-minded a commanding officer is, or how well drivers and mechanics perform their PMS, breakdowns will occur. This brings us to our *fourth principle* of motor maintenance. *Mechanics, tools, equipment, and parts must be made available where and when needed.* This is accomplished in spite of the fluid nature of our task by a flexible echelon system of motor maintenance.

highly mobile elements which can perform only a relatively few simple repairs, but which revolve about larger, less mobile maintenance units which can perform a larger number of more complicated repairs, and so on to the rearmost semi-fixed echelon which can perform any maintenance task.

The chart and tabulation, Figure 3, indicates the responsibilities and capabilities of each echelon, and also shows the manner in which work is routed through this maintenance system. Though the principal functions of each echelon are shown, it is not to be assumed that regulations limit the type of work any echelon may perform. The guiding principle of this system is that *all repairs will be performed in the lowest echelon possible, consistent with the availability of tools, parts, skill, and time, and also with the tactical situation.* However, no echelon will perform the work of a higher echelon at the expense of neglecting its own assigned functions.

Frequent mention has been made of the use of replacement unit assemblies. This brings us to our *fifth principle* of motor maintenance. The Army has prescribed that all defects will be corrected by removing the entire unit assembly concerned (i.e., engine, transmission, etc.) and replacing it with a complete serviceable unit, unless the actual repair can be accomplished with the materials at hand in a shorter period of time without removal. This replacement procedure has the following advantages. First, the repair can be completed more rapidly. Second, as the replacement operation is much simpler than a repair job, less skilled labor and fewer tools are required. A third advantage is that more intricate and delicate repairs can be performed under the adverse conditions encountered in the field, without fear of damage by dust, water, etc.

The foregoing paragraphs have mentioned briefly our *sixth principle*: *collection, evacuation, and recla-*

# ESSENTIALS OF MOTOR MAINTENANCE IN THE FIELD

## ECHELON SYSTEM OF MOTOR MAINTENANCE

(This chart gives a general picture of the operation of the Echelon System and does not include all details.)

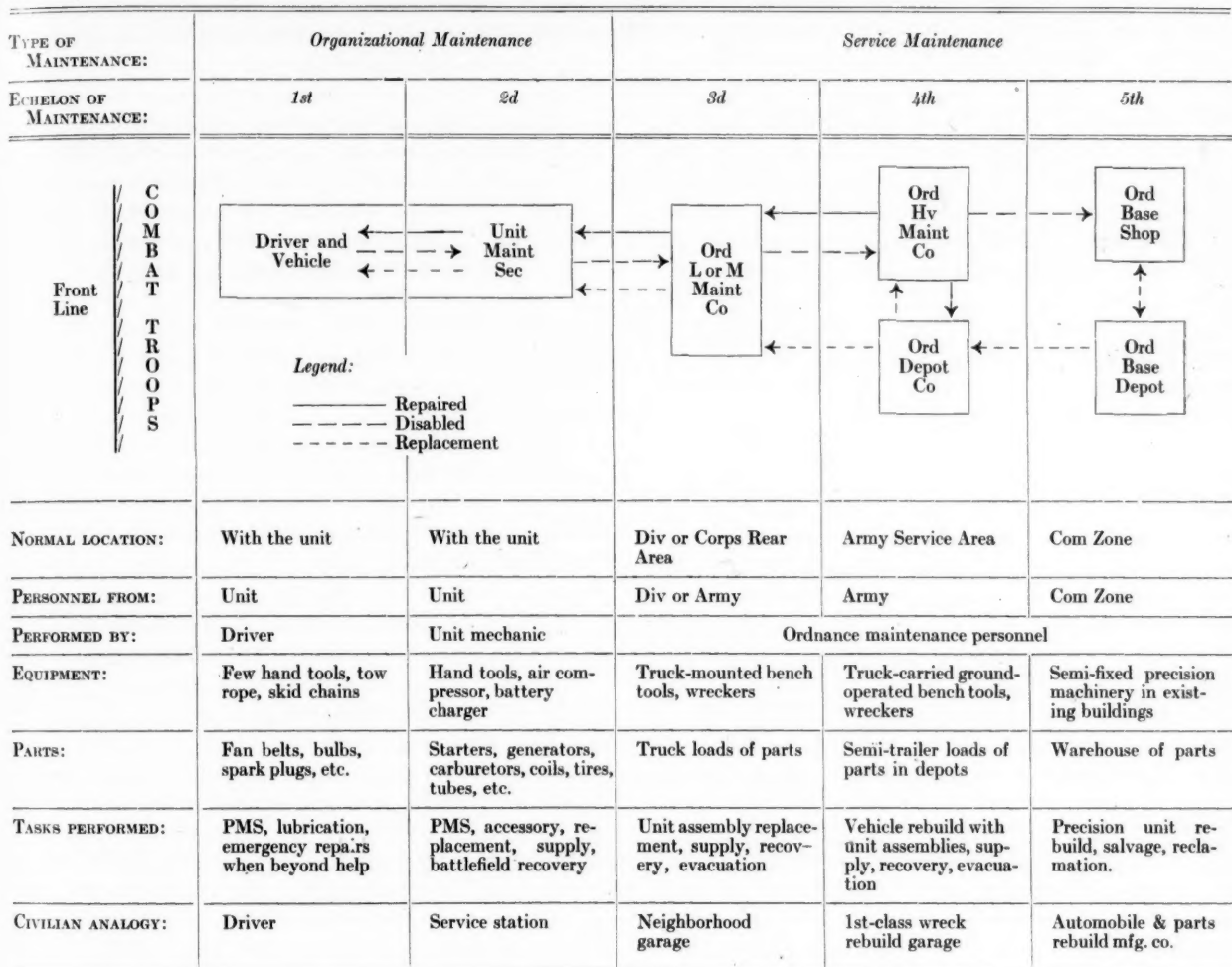


FIGURE 3.

*mation of unserviceable matériel.* It is the responsibility of all to recover unserviceable matériel from the battlefield. Combat troops should recover and evacuate matériel to the collecting points, provided that such action does not interfere with their mission. Every vehicle, soldier, or prisoner returning from the front should carry salvage to the rear. Priority should be given to matériel which can be repaired and returned to service with the least delay. If combat troops cannot evacuate salvage, they should notify service units of its location so they may collect it.

Evacuation from the collecting points to the rear is the responsibility of the service units. Matériel from ordnance collecting points is evacuated directly to the fourth echelon ordnance shops. Usable ordnance matériel at salvage collecting points is segregated by attached ordnance personnel and

evacuated to the fourth echelon shops. The fourth echelon maintenance shops repair and assemble serviceable vehicles from these parts, and evacuate unit assemblies to the fifth echelon shops for rebuild.

Experience indicates that the motor maintenance system of the Army is basically sound. It is up to each one of us to make it operate efficiently. What can we do as officers to fulfil our maintenance responsibility? First, we can make sure that we have properly selected and possess the best drivers and mechanics available. Second, we should maintain constant supervision of them at all times. Third, we can stress PMS and make frequent inspections to determine that it is maintained at the proper standards. And finally, we can make sure that all unserviceable equipment is evacuated promptly to the proper collecting points.



# Tactical Study of Terrain

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THE military commander must analyze the terrain upon which he expects to operate, and this analysis must be made before he makes his decision as to how he will employ his unit in the situation which confronts him. This procedure must be followed by every commander from the squad leader to the general in command of an army in order that terrain may be used to the maximum advantage. In this day of mechanization and balanced opposing forces, terrain is often the only factor left upon which to base a decision.

No matter what the situation may be, terrain should always be evaluated in terms of five factors: observation, fields of fire, concealment and cover, obstacles, and routes of approach or communication. *Observation* of the ground on which a fight is taking place is essential in order to bring effective fire to bear upon the enemy. It also affords information of what the enemy and the commander's own troops are doing and makes it possible for the commander to control the operations of his own troops. *Fields of fire* are essential, especially for the defense. An ideal field of fire is an open stretch of ground in which the enemy can be seen and within which he has no protection from fire as far as the effective range of weapons. This is rarely realizable; therefore fields of fire, bearing in mind the importance of concealment, must be improved by clearing and burning weeds, brush, trees, and crops, demolishing buildings, and cutting lanes through woods. The time and labor available for such improvement must be considered in evaluating the terrain. *Concealment* from view both from air and from the ground may afford cover only so long as the enemy does not know that the natural or artificial feature is occupied. Cover includes protection from fire afforded by accident of terrain or by other natural or artificial means. *Obstacles* are obstructions to the movement of forces; and the common natural obstacles are mountains, rivers, streams, bodies of water, marshes, gullies, deep ravines, and heavily wooded terrain. Mountain ranges which are parallel to the direction of an advance, limit and prohibit lateral movement but protect the flanks; when perpendicular to the advance, they are an obstacle to the attacker and aid the defender. Rivers are similar to mountains in their effect on forces moving parallel and perpendicular to them and, in addition, when flowing parallel to the advance may be used as routes of supply. Marshes frequently provide more delay to an advance than streams or bodies of water, for it is generally more difficult to build causeways than bridges. Armor and mechanized vehicles can be restricted in movement by dense

woods, marshes, steep inclines, gullies, stumps, large rocks, and water three feet or more in depth. *Routes of approach* or communication, that is, roads, railroads, waterways, airways, and their facilities, are important to both offense and defense for the movement of supplies. In operations of large bodies of troops the means of communication are of vital importance. Of course, the commander can not always utilize all of these factors of terrain evaluation to the best advantage. Many times it will be necessary to decide which of them is the most important. For example, a defensive position against a threatened armored attack would be selected primarily with a view to utilizing the best obstacles which the terrain offers even if some other factor, such as fields of fire, were comparatively poor.

Terrain objectives, normally, are clearly defined features the capture of which will insure defeat of a hostile force or from which the operation may be continued. Terrain objectives, in the attack by ground forces, usually are located in or in rear of the hostile artillery area and may be a feature affording commanding observation, a critical point in the hostile command system, essential supply routes, or an obstacle to armored forces. In selecting an objective, the commander must consider the distance to be covered and the size of the unit which is involved. In a division or smaller unit, the objective will normally be within the probable limits of a one-day advance, whereas the objective of an army may be selected several days advance from the time of movement.

Features such as ridges, streams, woods, roads, and towns divide practically all terrain into more or less separate areas. Such an area frequently consists of a valley lying between two ridges or an open space between two wooded areas. When the features inclosing an area prevent direct fire and ground observations into the area from positions outside, the area is termed a "compartment." Terrain compartments are classified in accordance with the direction of the longer dimension in relation to the unit utilizing the terrain. A compartment whose longer axis extends in the direction of movement of a force or leads toward or into a position is called a "corridor," while compartments extending across or oblique to the direction of movement of the force or its front are designated as "cross-compartments."

In general, a corridor leading toward or penetrating the enemy position usually implies a combination of terrain factors favorable to the attack in that it affords an avenue of approach and facilitates infiltration and penetration. Troops attacking within a

corridor are afforded some defilade from hostile small-arms fire outside it. The features bounding it limit ground observation, and this is of special importance since it reduces the effectiveness of hostile artillery fire. While a unit advancing or attacking along a ridge is subject to direct observation and fire from enemy troops on either side of that ridge, a unit advancing or attacking in a corridor is subject to direct observation and fire only from that corridor and can concentrate all its attention and fire power upon neutralization within the corridor. Where terrain is the decisive factor, boundaries between tactical units in the attack may coincide with the boundaries of corridors. In the defense, conversely, corridors are a source of weakness. The defense is built around a series of tactical localities, the retention of which will insure the integrity of the position. One subordinate commander should be responsible for each locality; and since they generally include the high ground which affords observation and command of the attacker's approach, the boundaries in defense are located between the higher places. That is, a boundary usually is placed along the slope of one of the ridges inclosing a valley. Similarly, it is preferable to avoid placing a boundary within a woods or village.

Throughout cross-compartments, observation and fields of fire are practically continuous across the

length of the entire front. This is an advantage to the defender, for it permits him to concentrate artillery and small arms fire upon various parts of the front without changing observation posts. In attacking a defensive position which has utilized a cross-compartment, the attacker must neutralize a relatively wide front which has no definite limits on the flanks. Thus an attacking unit usually cannot neutralize all of the fires bearing upon it but must depend upon adjacent units for assistance. Responsibility becomes less clearcut, and more dependence must be placed upon cooperation between adjacent units.

In a study of terrain with respect to the shape of the ground, drainage lines and ridge lines form the natural basis. The study is best made over the actual ground, but it is most often necessary to use maps and aerial photographs. When using maps or aerial photographs, the study is aided materially by emphasizing and marking heavily the drainage lines, by drawing in heavy lines along the crests of ridges called "ridge lining," and, on contoured maps, by coloring between selected contours. All maps must be checked by air and ground reconnaissance; for works of man, especially routes of communication, are changing constantly, and even natural ground forms may change.

## Pay and Allowances—1792 Style

PAY AND allowances as established for the Army in 1792 present an interesting comparison between our present day practices and those of that time.

According to the *Army Register* of 1792, a major general received one hundred twenty-five dollars pay, twenty dollars for forage, and fifteen rations a day per month. A brigadier general was paid ninety-four dollars a month, his forage allowance for that period was sixteen dollars, and he was allowed twelve rations per day. A major's pay was forty dollars a month; he was allowed ten dollars a month for forage and four rations daily. Captains, lieutenants, and ensigns received pay of thirty, twenty-two, and eighteen dollars a month respectively; and while the captain got three rations a day, the lieutenant and ensign were allowed only two each. A chaplain was paid fifty dollars a month inclusive of forage and rations. Commissioned officers, at their option, were authorized to receive money in lieu of rations at the contract price at the posts where due.

Recruits were apparently at a premium in those days, for officers on recruiting service were entitled to \$2.00 for every recruit they obtained.

In the enlisted ranks, sergeants received five dollars; corporals, four dollars; and privates, three dollars a month. All received a six-dollar bounty for enlisting.

Ten cents was deducted from the pay of each enlisted man for hospital stores; in addition, the following amounts were deducted from each pay roll for clothing: sergeants, \$1.40; corporals, \$1.15; and privates, \$0.90. Incidentally, this made the private's monthly income only \$2.00.

The daily ration authorized for the Army during that period was as follows: one pound of beef or three-quarters of a pound of pork; one pound of bread or flour; and one-half gill [one-eighth pint] of rum, brandy, or whiskey or its money value where due. For every hundred rations, one quart of salt, two quarts of vinegar, two pounds of soap, and one pound of candles were allowed.

The Army in 1792 had an authorized strength of 104 officers and 2,128 enlisted men, a total of 2,232. The census of 1790 placed the population of the United States at 3,929,214; and on this basis the Army of 1792 provided a ratio of approximately one soldier for each 1,760 people.

# "Pass the Ammunition"

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MODERN warfare, be it in Italy, Africa, the South Pacific, or other remote regions, is warfare of Logistics, and no phase of Logistics is more important to the fighting man than the supply of ammunition. It is hardly necessary to say that ammunition is the basic combat supply requirement, for although the deeds of the Chinese, the Chetniks, and others, fighting without motor vehicles and often without food, are legend, no amount of patriotic endeavor can make a gun shoot without ammunition.

Ammunition supply remains, however, one of the most neglected of subjects for academic discussion. For years military instruction has assumed that somehow or other every gun would have enough to shoot and that no further mention was necessary. As a matter of fact, our troops, once they have reached actual combat, have somehow or other obtained enough to meet their requirements. The fact that they have done so is a tribute to a basically excellent system which has proved easy to learn when necessary, and easy to adapt to the many and varied conditions encountered in the various theaters of operations.

Should not the terms used in ammunition supply and the principles on which this supply system is based be understood by all military personnel, by G-3 as well as by G-4? As greater numbers of officers and men become familiar with the system and the ways in which it has been amended and adapted, will they not be able to cooperate more intelligently and thereby operate more efficiently? Let us start with two terms used by our Army which, though fundamental, are generally misunderstood. These two terms are "unit of fire," and "day of supply."

To tackle one's strongest adversary first is sound tactics, so let us tackle first the term "unit of fire." If there is any doubt as to whether or not it is the strongest adversary, that doubt should be removed by the following definition taken from Field Manual 9-5, dated 11 July 1942: "The unit of fire is an arbitrary unit of measure for ammunition supply, representing a specified number of rounds per weapon. The number of rounds per weapon varies with the types and calibers of the weapons. In general, it represents a balanced expenditure by the various weapons under conditions of normal action. It is a term used as a yardstick or a unit of measure for supply purposes from a tactical point of view. . . ." Let us consider the reasons for the existence of such a term and determine its practical meaning.

A modern composite force uses so much ammunition, of so many different types and calibers, that any

staff officer, trying to tell the commander or chief of staff just what ammunition would be required for anticipated action, would be faced with the preparation of a long list of quantities and types. In all probability he would also be faced with the question, "I see all of those figures, but what do they mean?" In order to provide a convenient shorthand, a basis for staff conferences, the unit of fire has been developed. It is simply a device which allows a G-3 to count millions of rounds of ammunition on his fingers.

As is stated in the definition quoted above, there is a unit of fire, a specified number of rounds per weapon, for each of the various types of weapons. The number of rounds prescribed for each of the weapons was originally intended to approximate the expenditure by that weapon during one day of normal combat. The impossibility of predicating an ammunition expenditure rate which will be standard for all types of combat in all theaters is obvious. Any determination of an average day of combat is also open to question. The result is that the War Department has withdrawn the time element from its definition, and has prescribed a set of values which is to be used solely as a guide, at the same time prescribing that theater commanders will have the authority to make such changes in those values as they see fit.

The result is the use, in this country, of an arbitrary set of values which have little practical significance. In the various theaters of operations, however, the theater commanders have modified the War Department values to fit conditions in their theaters and have prescribed values which approximate fairly closely, daily expenditures by combat units, averaged over short periods of actual, heavy combat.

A comparison of some of the unit of fire values prescribed by the War Department, with those used in the Buna campaign and those prescribed by NATOUSA\* for the North African campaign will help to illustrate the above.

Weapon	War Dept	Buna	NATOUSA
Cal. .30 Carbine	60	①	15
Cal. .30 Rifle	150	8.3	20
Cal. .30 MG	2000	111	500
Cal. .45 SMG	200	11.1	50
Cal. .50 MG, Grd.	500	50	500
37-mm AT	100	5.5	40
60-mm Mortar	100	5.6	60
81-mm Mortar	100	5.6	75
105-mm Howitzer	200	12.5	100
Grenade, Frag.	50②	8.3	20②

① Not stated.

② Per Co.

That expenditures can be predicted in advance

\*North African Theater of Operations, United States Army.



## "PASS THE AMMUNITION"

with reasonable accuracy is illustrated by Buna expenditures, averaged over twenty days of hot action. Accuracy should improve with experience.

Weapon	U/F	Average Daily Expenditures in U/F
60-mm Mortar -----	5.6 rds	1.05 U/F
81-mm Mortar -----	5.6 rds	3.3 U/F
Cal. 30 Rifle -----	8.3 rds	1.4 U/F
Cal. 30 MG -----	111.0 rds	1.7 U/F
Cal. 45 SMG -----	11.1 rds	1.6 U/F
Cal. 50 MG -----	50.0 rds	2.0 U/F
37-mm gun -----	5.5 rds	8.6 U/F
Grenade, Hand, Frag -----	8.3 rds	2.5 U/F
105-mm Howitzer -----	12.5 rds	5.2 U/F

Once the unit of fire values for the various weapons have been prescribed, it is a simple matter to find the total unit of fire for any organization. Take the total number of weapons of each type in the organization, multiply those totals by the corresponding values of units of fire, and the result is a definite number of rounds of each different type of ammunition. All of these types together make up the unit of fire for the organization.

Ammunition is also spoken of in terms of weight, primarily for use in figuring transportation requirements. Now note that while in determining a unit of fire in rounds, it is necessary to specify the number of rounds for each type of weapon, in transferring to a weight basis one figure can be used for a whole organization. For example, the War Department unit of fire for an infantry division weighs about 584 tons. This figure is arrived at by determining the number of rounds of each type of ammunition in a unit of fire for the division, transferring the number of rounds per type to tons per type, and then adding all of the weights together.

The convenience of using this term in staff discussions has already been mentioned. Where else is it used, and more important, where is it not used? Commanders of divisions or higher units may ask for credits in terms of units of fire. It is not practicable, however, to make allocations of ammunition below the army level in any terms other than rounds. Troops expend ammunition in rounds, relative expenditures of the various types not being constant, and therefore credits must be allocated in terms of rounds. The principal use of the term is in planning for large operations, in estimating probable expenditures and requirements. It is not used at all in echelons lower than a division staff, nor is it used in any of the paper work of ammunition supply.

Our first adversary having been defeated, or at least contained, it should be relatively easy to handle the second. A "day of supply" is defined as the estimated average expenditure of various items of supply per day in a campaign, expressed in quantities of specific items or in pounds per man per day. In the case of ammunition supply, day of supply is expressed in rounds per weapon just as is the unit of fire. The day of supply is the unit of measure used in establishing theater stock levels, in supplying thea-

ters, and in procurement. The most common use of the term is in prescribing theater stock levels. It has been prescribed by the War Department and can be changed only by the War Department although theater commanders can recommend such changes as they see fit.

To determine the total ammunition day of supply for a theater of operations it is necessary to determine the total number of weapons of each type in the theater and multiply the total of each type by the prescribed number of rounds per day for that weapon. The total day of supply will include all weapons in a theater, whether they are in the hands of combat units or are in reserve in a rear area; it is obtained by averaging expenditures over a whole campaign.

A brief comparison of the terms "unit of fire" and "day of supply" may help to emphasize their difference. Day of supply is used in determining the total amount of ammunition to be maintained in a theater of operations. Unit of fire is used in estimating expenditures in combat by a combat organization. Day of supply is based on all of the weapons in a theater, unit of fire on the weapons in a combat organization. Day of supply is determined by averaging all expenditures in a theater over a whole campaign; unit of fire is determined by averaging expenditures within a combat unit over a relatively short period of actual combat.

How does ammunition get to the combat units?

Ammunition is brought into the theater of operations from the zone of the interior and is stocked in depots in the communications zone. The ammunition stock level to be maintained in any particular theater is decided by the War Department and is figured in days of supply. It is customary to prescribe that there will be so many days of supply held in the theater with so many more days of supply on hand or en route. For example the War Department may prescribe that there will be sixty days of supply in the theater with thirty days on hand or en route. As reports from the theater show that the ammunition stockage is falling below the prescribed level, more ammunition will be shipped in to bring up the stock. Prescribed stock levels may vary with the different theaters of operations.

As the ammunition enters the communications zone it comes under the control of the theater commander and is stocked in ordnance ammunition depots directly supervised by the theater ordnance officer. The organization of ammunition depots and the distribution of ammunition stocks in the communications zone will depend upon the depth and organization of the communications zone itself. Ammunition arriving at a port of debarkation will come off the ship in bulk and, the primary concern being to get it off the docks and into some less exposed and more convenient location, the initial storage will probably be in bulk. The next step is to classify the ammunition and to break it down according to lot

number, caliber, and use. This may be done immediately or it may be accomplished upon moving the ammunition to some more thoroughly organized depot. Ammunition stocks in the forward part of the communications zone must be distributed so as to supply most conveniently the troops immediately supported. Thus, if the communications zone is divided into base, intermediate, and advance sections, the base section may well store the ammunition in bulk, the intermediate section classify and segregate the ammunition, and the advance section organize its depots so as to provide optimum service to the combat troops. The amount of ammunition held in each section will depend upon facilities available in the various sections and upon the transportation situation.

Based on ammunition available and the contemplated operations, the theater commander will decide what ammunition he wishes to allocate to the various army commanders. This information will go through the theater G-4 to the theater ordnance officer who will actually write the allocations. Each allocation, sent to the army ordnance officer concerned, will notify him of the ammunition available to his army. Copies of the allocations are sent to the regulating officer who is also notified where the ammunition is stocked.

Based on the tactical situation, on the recommendations of divisions and corps, and on the ammunition available to him, the army ordnance officer will decide where he wishes to locate army ammunition depots and ammunition supply points (ASP's).

An army ammunition depot will usually be a railhead or navigation head, and will be established as far forward as the means of transportation used is available. As such it may be as far forward as thirty miles behind the line of contact. Since it is intended that it be established as far forward as rail or water transportation is available, it may serve as a transfer point where ammunition shipped that far by rail or water is transferred to trucks for carrying still farther forward. It may serve simply as an ammunition reserve for the army and a supply point for army troops. Actually, although it may serve either of the two purposes mentioned, it will usually serve a combination of both.

Combat units draw ammunition directly from ammunition supply points, ASP's. These will be established as far forward as possible, but out of medium artillery range, and will probably be from eight to twenty miles behind the line of contact. They will usually be truckheads, since it is highly improbable that rail transportation can be maintained so far forward, but if rail is available, they may be railheads. If they are truckheads, they will probably be supplied from an army depot: if railheads, they will be supplied directly from the regulating station. An ASP will normally stock about one unit of fire for a division, from 500 to 600 tons, but each division will

have credits at at least two ASP's. The service provided a unit does not depend upon the size or number of ASP's, but rather upon the number of vehicles that can be loaded simultaneously.

Since ammunition involves the greatest tonnage of supplies for ground units, ASP's should be given preference in the selection of locations in forward areas. Because of the large tonnages involved, ASP's and depots are very seldom, if ever moved. The preferred procedure, when a new location is necessary, is to move a new supply of ammunition to the new site and deplete the stock at the old one by issue.

After the army ordnance officer's recommendations for location of the depots and ASP's have been approved, he will call on the regulating officer to send ammunition to the points selected. Of course, the army credit is reduced by the amount of ammunition shipped.

The army ordnance officer confers with Army G-4 regarding the allocation of ammunition to corps. A plan is drawn up based on the tactical plan of the army and is submitted to the commanding general through the chief of staff. After approval, the ordnance officer sends allocations to the corps ordnance officers, advising them that they have credits of definite amounts and types of ammunition at specified supply points.

The corps ordnance officer has two main functions with respect to ammunition supply. The first of these is the allocation of ammunition to divisions and corps troops. Upon receiving an allocation from army, the corps ordnance officer confers with the corps G-4 regarding the distribution of available ammunition. A plan is drawn up based on the tactical plan of the corps and submitted to the corps commander through the chief of staff. After approval the ordnance officer sends allocations to the division ordnance officers. These allocations are similar to those sent by army to corps and they advise the divisions that they have credits of certain quantities of ammunition at designated ammunition supply points. Of course, the total allocations made by the corps ordnance officer cannot exceed the allocation he received from army.

The second responsibility of the corps ordnance officer with regard to ammunition supply is the recommendation, to army, of allocations for ASP's to support the troops of the corps. Since ASP's will often serve more than one division, it is important that division recommendations be coordinated by corps. Of course, corps recommendations are subject to army approval.

The system of ammunition described in the foregoing paragraphs is an idealized one. It could never be applied exactly. Modified to fit existing conditions, however, it is now in use in every one of our theaters of operations. It embodies the basic principles of simplicity, mobility, flexibility, elasticity, continuity, and forward movement. It will work!

# Air Discipline

[From an article by Brigadier General Frank A. Armstrong, Jr., former Group CO, 8th Bomber Command, in *Air Force* November 1943.]

IT IS sometimes hard for young officers to grasp the meaning of air discipline. They feel they know their jobs, know their equipment, and have confidence in both. But let them knock around in combat with heavy bombers and they'll learn that good equipment and skill are not enough. And I will throw in courage and the will to fight for good measure. Something more is needed. That something we call air discipline.

Perhaps the first thing to be learned is that we are flying bombers and not fighter-bombers, no matter what you may read in the papers. Our aim is to get to the target, drop the maximum number of bombs, and get home again so we can prepare to drop more bombs. We fight through necessity, not through choice. Under no circumstances on a bombing mission do we leave our prescribed course to find enemy planes. There is not a man among us who wouldn't like to take every crack he can at the Hun. But our cracks come in bombs. Bullets are only a means to an end.

Formation flying is air discipline applied. Its overall objective—maximum striking power with maximum protective power—is always the same. Its method of application is constantly in a state of flux. The enemy tries something new and we counter. When he switches his attack we're all set to change our defense. We can be likened to a catcher and an infield on the alert for a bunt.

We fly a fairly tight formation, but each bomber is assigned a block of air within which he may maneuver and alter his speed and altitude depending on the situation and the types of attack. It is vital that each pilot understand how much freedom he is allowed and how far he can go without stepping out of formation.

When a plane drops out, it not only jeopardizes its own position but takes twelve guns away from the formation. And when a plane is shot up and starts falling behind we have to let it go. We can't send more planes to stick with it. That would weaken our main effort. It's not easy to continue on your way when you see a ship drop out and know that enemy fighters swarm over a straggler like ants on a fallen sparrow. We do everything we possibly can to save every ship and bring them all back, but air discipline demands that we protect the group.

Knowing that we bomb as a group, the enemy tries to knock down the lead plane. He thinks that is his best bet. But to date the Hun has never turned back a formation. We don't turn back! And we don't jettison bombs—no matter what happens.

The lead bombardier sights for range and deflection and the other planes follow his run. But every bombardier in the formation gets the data in his bombsight. He must be ready to take over in the event something goes wrong with the lead plane or his own ship is knocked out of formation.

During a bombing run, when the success of the whole mission depends on what is accomplished in a two or three-minute interval, there is no time for formality or for recognition of rank. When the bombardier takes over the ship for the run on the target, he is in command. I don't care what the relative rank between pilot and bombardier, the bombardier tells the pilot what he wants done. And he doesn't stand on any of the niceties of military etiquette. The bombardier *tells* him.

There may be other occasions when the pilot is so guided by another man's judgment, when he virtually relinquishes command of the plane for a brief period. But the pilot is always the captain of the ship. And yet, except when some vital decision is to be made, it is seldom necessary for the captain to exert his authority. The authority is his and the men know it. He is the man responsible for nine other lives and for an expensive piece of equipment. Pilots should always be on their way to becoming squadron CO's, and I can't think of a more important job. The first prerequisite of a good CO is being so good as a pilot that the rest of the squadron trusts him implicitly.

A pilot can be a good CO and still be congenial, a regular guy. You can command respect from your men and yet live with them and be one of them. You can't be too lenient and you can't be too hard. Above everything, you must have their welfare at heart. When they know how you feel about them they will give you the maximum support.

That understanding between captain and crew is part and parcel of the relationship between one crew member and another, between a group of specialists pooling their efforts in a single job.

Every man on the plane should know the duties of every other man. I've seen a navigator and top-turret gunner bring a plane in together. The pilot was wounded and couldn't use his arms. The co-pilot was knocked out. So the navigator slipped into the co-pilot's seat and handled the controls; the top-turret gunner worked the throttles; the pilot gave them advice. Between the three of them, they brought the ship in.

Air discipline is essential in gunnery, for in a bomber it is necessary for every man, regardless of his position, to know how to handle the guns.



Gunners are instructed to cover certain fields of fire. This procedure is carefully worked out according to the place of the individual planes in the formation and is designed to bring the maximum number of guns to bear in every position. No matter how certain a gunner is of getting an enemy plane, no matter how badly he wants that plane, he must discipline himself not to swing his gun out of the line of fire he is instructed to cover. It may mean that he has to pass on a sure kill to another gunner, but, more important, it means protection against another enemy ship slipping in at an uncovered angle.

Each man should be proud of his own work and should feel he is an essential part of every operation. During the early days of our bombing missions over Europe, we showed the pictures of the results of bombing raids only to the pilots and bombardiers. But soon we realized that each member of our air and ground crews was a part of every raid and had a right to see the pictures. We posted photographs in squadron dayrooms. We displayed pictures of aerial combat, too. Now each man can view the results of his work, can profit by his errors and feel a personal satisfaction in a job well done.

Perhaps the best insurance for air discipline among crew members is the fact that a man who is undisciplined is unlikely. Discipline and popularity go hand in hand, in a very practical way. An undisciplined man will fail to carry out his specific duties and will jeopardize the other members of the crew. And the other men know it.

Thus, discipline breeds comradeship, best illustrated, perhaps, in the talking that goes on over the interphone. And there should be plenty of interphone

chatter, except when a vital piece of information is to be exchanged or when the plane is over the target. Not only is it good for morale but it serves as a means of keeping crewmen alert, as a check in determining whether crew members are all right, and as a quick method of relaying information on enemy fighter attacks and antiaircraft fire.

To associate discipline with informality, comradeship, a leveling of rank, and at times a shift in actual command away from the leader, may seem paradoxical. Certainly, it isn't down the military groove, but it is discipline just the same—and the kind of discipline that brings success in the air.

I firmly believe that if you fly and fight intelligently—the way the people in the theater teach you to fly—and if you observe air discipline, your only serious trouble will come through bad luck. You can be hit crossing the street when you're in the correct zone and the light is with you. It won't be your fault but it can happen. That, to me, comes under the heading of bad luck.

But a lot of so-called bad luck is due to lack of alertness—or a relaxing of air discipline. There can be no letdown over enemy territory, or even near home base on a return from a mission. Occasionally, when returning from long flights, we do what we can to make ourselves comfortable, such as dropping to an altitude where we can stop using oxygen. But in such cases, it is folly to relax. Combat crews must be disciplined to remain alert until they step from their ships on the home field.

Discipline in the air isn't easy. It means a long hard grind all the way. But it means successful bombing, and no grind is too long and hard for that.

## New Airplanes for Old

BRITISH Aircraft Repair Establishments have become almost as important to the RAF and Fleet Air Arm as the main aircraft construction factories. In 1940 these establishments put out 13 repaired aircraft for every 100 new aircraft produced. Today, their output is 70 repaired aircraft for every 100 new aircraft, although the output of new aircraft has in the meantime tremendously increased.

An even bigger increase has been accomplished in the output of repaired aircraft parts. For every 100 air-frames, engines, and air-screws repaired in the first half of 1940, there were 1,080 air-frames, 945 engines, and 2,207 air-screws repaired in the first half of 1943. One firm of instrument makers recently completed the repair of a quarter of a million aircraft instruments.

The Aircraft Repair Establishments are run by the Ministry of Aircraft Production. They have a high reputation. No pilot objects to flying a repaired aircraft, because he has learned to trust the skill and care of the workers, managements, and test-pilots. Many aircraft undergo repeated repairs. One Spitfire has been repaired nine times, has had six pairs of new wings fitted, and is now in service.

Speed is important, both in repair work and in the clearance of damaged aircraft, which is also a duty of the Repair Establishments. It is achieved. As an example, a Typhoon recently belly-landed on an air-drome at 8:30 in the morning. A crash inspector was there at 8:40. A salvage gang had cleared the air-drome by 9:00. By 3:30 the Typhoon had been dismantled and removed to the factory for repairs.

# Reconnaissance by Medium Armor— Mateur, May 1943

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THE TERRAIN in northeastern Tunisia, over which the last phase of the campaign of 1943 was fought, is open, rolling prairie, ancient sea-bottom, baked by the sun to a black hard-pan almost the consistency of soft coal. There is practically no overhead cover, but the deep gullies and narrow valleys lend themselves readily to ambush. Habitations are few. Outside the towns, these are mud-walled Arab "douars," surrounded by high hedges of cactus. The stream lines, for the most part dry at the season in which the action took place, are deep and wide with precipitous banks. The main stream lines are called "oueds," and the tributary gulches "waddys." They are formidable tank-traps, as are the salt marshes, formed by seepage from the sea. The Mediterranean bounds the area on the north and east at a distance of about twenty miles.

The bulk of the material from which the following account is drawn was obtained on the ground. It was consolidated at the Officers' Club in Bizerte, the former Italian Naval Hospital, where fluid called wine was served in telephone insulators, there being no other glassware obtainable. German sources were available during a night flight by freight plane, when the shivering passengers, coming from a temperature of a hundred and ten on the ground, suffered in the bitter clutches of forty degrees in the air. If the heat was turned on, the plane became an oven; and if it was left off, the plane was an ice box. The long hours of that night of hell were passed as warriors have passed such nights since the dawn of time, in telling tales of combat and of sudden death. Only in this case the technological advance of warfare deprived us of those two major aids to story telling, wassail and a hot fire.

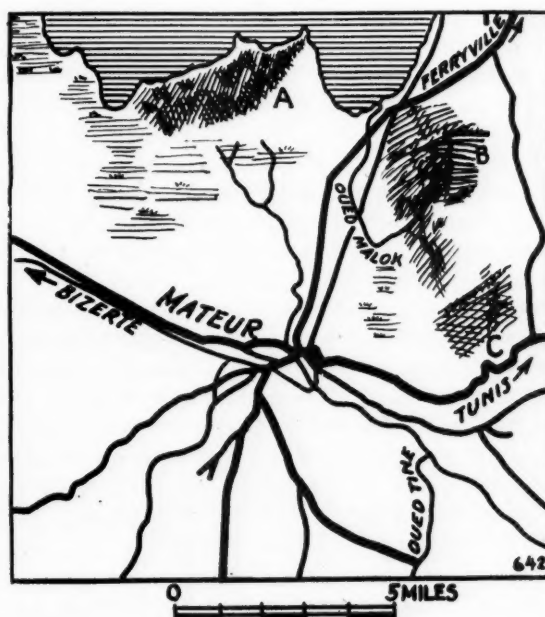
Standing orders in the North African theater require the periodic surrender of all diaries, notes, message-duplicates, marked maps, etc., to the base censor. The following account is therefore drawn entirely from memory. It is warranted, however, to be substantially correct.

Mateur is a flourishing, modern, typical French colonial town in northeastern Tunisia. It is situated in a natural bowl at the intersection of several valleys. Bizerte-Tunis, Tabarca-Tunis, Ferryville-Wenk el Arba, all metalled roads, intersect at Mateur, as well as the numerous "oueds" that follow the valleys. The town itself, viewed from the south,

looks like a theatrical set. The impression is the more vivid since it is seen from high ground, looking down as from a balcony.

On 3 May, a combined British and American force occupied Mateur; the German former occupants retiring to the east across the Oued Tine. Previous to withdrawing, however, the enemy had done a thorough job of demolishing the bridges over the three large oueds that run through the town and its suburbs. The British favored an immediate attack, before the enemy could consolidate defensive positions on the high ground north and east of Mateur, but the American armored commander counseled delay until the engineers could build new bridges, estimated to require forty-eight hours. It was realized that a properly organized and coordinated assault employing massed armor might very well bring disaster to the German forces in the entire theater. But this blow had to be backed up by adequate supply, and it had to be shattering in its effect. If too much armor was lost in an unsuccessful shove, the enemy would be able to evacuate the bulk of his troops from the Tunisian peninsula.

Early indications were that the enemy was organizing the high ground north and east of the town, three hill masses marked A, B, and C on the accompanying sketch. A, the Djebel Achkel, could be eliminated, as it backed on a salt lake and could easily be surrounded and reduced by siege. Hillmass B and C, however, barred the route to Ferryville



and the sea whence the Germans planned to evacuate their forces in this sector from Tunisia. Hillmass B, the Djebel Berna, was obviously the most dangerous position and must be reduced first. The German positions on hillmass B were protected by a natural barrier, the Oued Malok, with deep bed and precipitous banks. The reconnaissance battalion of the American armored division penetrated the German lines under cover of darkness and found that the Oued Malok could be crossed by tanks in three places.

With the above information the American armored commander began to plan the attack, meanwhile urging his engineers to complete his bridges rapidly. It was impossible, however, for him to gain any further information by daylight reconnaissance, due to interference by German artillery and continuous sorties by a platoon of German tanks. Hillmass B is steep, rocky, eroded, and forbidding. Its gullies and dry washes are ideal hide-outs for antitank guns. Moreover, close reconnaissance was necessary even to determine the direction tanks could take in making the assault. The American armored commander, therefore, ordered another reconnaissance to be made on 5 May, supported by a company of medium tanks. These tanks could first fight off the German harassing tanks, and reduce or neutralize any enemy artillery that challenged it.

The reconnaissance in force was heavily opposed by field and antitank artillery, both from hillmass B and from hillmass C, the toe of the Djebel Sfalâ, a long range that runs away to the west. Hillmass C, prior to the appearance of the American medium tanks, had remained silent. The bulk of the German antitank artillery was revealed to be on hillmass C. Since this hillmass was lower and more easily scaled by heavy vehicles than B, more of the cumbersome 88's had been emplaced there. Another advantage to the enemy of positions on hillmass C was that guns there would take an American assault on hillmass B in flank. Tanks taken in flank are more easily set cooking than those taken under frontal gunfire.

Hillmass B was by no means behindhand in displaying its own charms during the reconnaissance in force, but it was seen that the position had been hastily organized, and was vulnerable to an *intelligent* armored assault. The Oued Malok could be crossed by a pressure attack, while an envelopment could be pushed between hillmass B and hillmass C to take positions on the slopes of hillmass B from the rear. Possession of hillmass B, the dominating terrain feature in the sector, would bar the route to Ferryville and force the surrender of all German forces in the area. The envelopment, of course, could not succeed until enemy artillery on hillmass C was first eliminated by one means or another.

A German commander told me later that the German plan provided for lightly held forward posi-

tions, backed up with antitank guns, until the direction of the main Allied effort could be determined. This might be directed either to the northwest toward Bizerte, or to the northeast toward Ferryville and Port Farina, a small harbor on the Mediterranean. The German G-2 was also confused by reports that two American armored divisions were opposing them. The division commander, the chief of staff, and the G-3 of one had been identified as directing operations, and several individual units of the other had been identified. If two American armored divisions were operating in the sector, it was probable that one would advance against Ferryville and the other against Bizerte. The reconnaissance in force supported by the medium tank company was believed to be a real assault, to be followed by another more serious try on the next day.

The plan of the American armored commander for the main assault provided that hillmass B would be taken by envelopment from the east, the envelopment to pass between B and C; that the bulk of the artillery would be in direct support of the assault on hillmass B, one battery to smoke hillmass C during the assault on hillmass B to render ineffective enemy antitank guns in that location, the crossroads behind C to be interdicted by "Longtoms" borrowed from corps; that German forces on hillmass A would be contained by reconnaissance elements.

Among other measures taken by the Germans to meet the American attack, they dug in about a battalion of infantry in individual fox holes between the Oued Malok and the base of the hillmass B to lie quiet while the tank attack passed through and over them and then come out and destroy the American infantry that they assumed would be following the tanks.

The attack took place the following day and was successful in carrying all objectives. Having a shortage of infantry, the American armored commander did not have any infantry to follow up the tanks in his holding attack, which tanks moved on to their objectives. The German infantry occupied their fox holes in front of hillmass B until the following day, when they realized that their role had become superfluous and surrendered.

Late the same day, the enemy counterattacked with two battalions of infantry, and succeeded in retaking the northern slope of hillmass B. A platoon of medium tanks was sent to support our infantry in its effort to re-take the slope. This platoon lost a tank during darkness in the climb up the mountain but succeeded in clearing the high ground of the enemy. No targets could be located due to darkness, but the noise of the tanks and the impression caused by a heavy expenditure of tracer ammunition so impressed the enemy that he withdrew. This was the last attempt at real resistance in Tunisia. The next day burning dumps indicated that the enemy was preparing to throw in the sponge.



It was two days later, however, on 9 May, when the German commander in the Ferryville sector appeared at the armored division command post to discuss terms of surrender. Having taken a bitter defeat himself, and still believing that two American armored divisions were operating in the sector, he made plain that in suing for terms he spoke only for himself and the Ferryville sector. It was felt by my German informants that the Ferryville general wanted the two American armored divisions turned against Bizerte in order to "shellack" his colleague commanding in that sector.

"The attack continues," was the American armored commander's reply, "and if you want to save your men, you'd better get hold of your buddy in Bizerte and have him surrender too."

As the German commander departed on this mission, his colleague from Bizerte arrived somewhat breathlessly, to announce that he felt further resistance would be folly. He, too, apparently labored

under the impression that two armored divisions were about to operate against him.

Only one American armored division was in the sector. I told this to the German officer-prisoners on the freight plane. The reason for their confusion as to the number was natural, but cannot be divulged at this time. One of them told me that the hypothesis that two American armored divisions were opposing them was confirmed by the belief that only a commander having an excess—and a large one—of armor would employ medium tanks on a reconnaissance mission.

"It is against accepted practice," commented another German, "to employ medium armor in reconnaissance. The appearance of American medium tanks was therefore mistaken for an assault. Anti-tank strength in the vicinity of hillmass C was prematurely employed to repulse this assault, and our prepared ambush was disclosed. The entire position collapsed the following day, and our hope of evacuating the peninsula of Tunis collapsed with it."

## Ramming Enemy Planes

[An article by Captain P. Shavurin, Soviet Army, in *Information Bulletin*, Embassy of U.S.S.R., Washington, D.C., 7 September 1943.]

OUR AIR unit was guarding an important main-line railway along which troops, stores, and ammunition moved to the front. One day we received information that an enemy air formation flying at a high altitude was approaching from our rear. Our commander ordered Pilot Fedor Kozlov and myself to intercept the enemy.

We took off and began climbing. Soon Kozlov radioed that his oxygen apparatus was not working and I continued alone. At 21,000 feet I saw a Junkers-88 bomber on a long-distance reconnaissance flight behind our lines. The Junkers was flying a straight course. I took advantage of this to get closer to him. Knowing a serious fight was ahead, I had been sparing my engine, but now I put on speed and climbing to 1,500 feet above the Junkers I tried to approach him from the sunny side unobserved.

Selecting a suitable moment for attack, I dived, aiming my guns at the gunner and the pilot's cabin. The German gunner immediately replied with a stream of tracers which passed somewhere to my left. Suddenly the Junkers turned off its course and made for the clouds. In two or three seconds he would be hidden and so get away. The only thing left to do was to ram the German bomber straight from a dive, as I would have no time to recover and turn after him.

The speed of my plane during the dive was very great. To avoid becoming entangled in the enemy

aircraft I made for the plane's tail. My propeller struck the rudder and stabilizers of the Junkers and my right wing struck his left wing. The German bomber turned over on its back and went into a spin from which it never recovered. The whole crew was killed in the crash. My own propeller buckled and my right wing was torn completely off. The plane, out of control, began to dive tail first. I tried to parachute but this was extremely difficult—some force seemed to press me down in the seat. After many attempts I succeeded in placing my foot on the seat, the pressure relaxed somewhat and I threw myself out of the cabin. After I had dropped some distance my parachute opened and I landed safely.

What conclusions may be drawn from this dangerous air combat? I rammed the enemy from a dive—what we call a "striking dive." This differs from the usual ram, which can be made only with the propeller and usually leaves your own aircraft undamaged. The striking dive is employed only in critical circumstances, when the enemy must be destroyed at all costs and there is no other way of dealing with him.

The "striking dive" must be carefully calculated and the blow delivered at the tail or some other easily damaged part of the machine. Above all it must be made coolly, keeping in mind that the enemy must be destroyed. The slightest weakening of will may lead to disaster.

# Teaching Military Subjects

[An article by Lieutenant Clifford P. Morehouse, USMCR, in *The Marine Corps Gazette* October 1943.]

EVERY officer and noncommissioned officer in the Marine Corps is likely to be called upon to teach various military subjects from time to time and should be prepared to do so efficiently. There is nothing mysterious about the technique of teaching, and yet its essential principles are frequently violated by well-intentioned instructors. Unfortunately, men who know a given subject thoroughly may not be able to impart their knowledge to others, and thus the value of the knowledge is restricted to the individual. On the other hand, a man who can impart his specialized knowledge to others multiplies his effectiveness many times over.

A recent War Department publication, *Army Instruction*,\* will be found very helpful in teaching the potential instructor the most effective way of imparting his specialized knowledge to his students. As this manual well observes, "the ultimate objective of all military training is to assure victory in the event of war." Proper instruction provides a short road to combat success.

The Marine Corps also publishes a useful little *Instructor's Guide*, available from the Marine Corps Schools, Quantico, Virginia. This booklet gives practical advice on such subjects as preparation by the instructors, methods of instruction, aids to instruction, and lesson planning. A valuable section deals with the general principles of public speaking—an art that is important to anyone who wishes to hold the interest of his audience and transmit his ideas clearly to his hearers.

The teaching process is logically divided into five stages: (1) preparation, (2) presentation, (3) application, (4) examination, (5) discussion and critique. *Army Instruction* indicates ways in which these five stages may be effectively applied to any branch of military science.

Preparation is the first and most important stage for the instructor. Instruction, like a tactical operation, must be planned and the same general principles apply to the planning. This must begin with an estimate of the training situation—the purpose and scope of the instruction, the essential subjects to be covered, the time available, the equipment and facilities, the instructional personnel, and similar considerations. In terms of his estimate of the situation, the officer in charge arrives at his decision in regard to the plan of instruction. Next, material must be selected, adapted to the ability of the men being instructed. The objectives should be practical and the

material suited to the facilities at hand. Sometimes this material will take the form of text books, sometimes of slides or training films, and sometimes of the object itself. For example, if the subject is to be the 60-millimeter mortar, it will obviously be advantageous to have the mortar itself available as well as the manual concerned with it and possibly also a training film.

Military instruction, particularly in wartime, differs from civilian instruction in the degree of concentration on the subject. In civilian instruction the aim is generally to develop a certain skill in its relation to a broad general background of related information. In wartime military instruction, it is necessary to lay much greater emphasis on skills and procedures and to omit or minimize background material and related information. The exigencies of wartime training are such that instructors must ordinarily concentrate on the most essential matters that the student must know and eliminate those things that it may be desirable to know but that are not absolutely essential.

Having determined the scope of his instruction and selected his material, the good instructor will prepare each lesson with great care. A good lesson should be a unified segment of instruction containing some new material related, however, to the lessons already presented. It should be reasonable in scope. The presentation of too much material in one lesson results in confusion; too little, in inefficiency. Each lesson should be so planned that its relation to the course is clear to the students.

Having planned his lesson carefully, the instructor must take equal care to see that he presents it in an interesting and attention-compelling manner. He should have rather full notes, because even if the subject is very familiar to him he may overlook some important point without them. However, he should not read his notes or the lesson itself. It is far better for him to give the information clearly and directly, watching the faces of his students to see that they are assimilating the material as he goes along. Proper use of charts and illustrative material is particularly important.

The posture and teaching habits of the instructor are also of great importance. The instructor should have military bearing and appearance and should avoid annoying habits such as playing with his pencil, fumbling with his watch, and making unnecessary gestures. He should be as punctual in coming to class as he would be in reporting for drill, and his conduct before his class should be as carefully governed as it would be before the reviewing stand.

\* TM 21-250, available from Government Printing Office at 30 cents.

Teaching is, in a sense, a function of command, and the same characteristics that lead his men to respect him on the drill field will also cause them to respect him in the classroom.

The instructor should avoid being too technical. It may be that he knows his subject so thoroughly that it is commonplace to him, whereas it is new and strange to most of his students. On the other hand, if he is not familiar with his subject the class will be quick to notice that fact and he will immediately lose their respect and attention.

Directed discussion is one of the best methods of teaching, but it requires a skilled instructor to keep the discussion from degenerating into an argument or a bull session.

Demonstration is also a vital part of the teaching technique, and the instructor should be able to demonstrate practically and efficiently the subject that he is teaching. If, for example, he is discussing the M-1 rifle, he should be able to demonstrate without hesitation how to strip the weapon, how to clean it, and how to re-assemble it. If he is hesitant in these matters himself, he will not get the best response from his students. Good demonstrations require careful preparation and rehearsal. They are generally not effective with large groups, because it is important that each individual see and understand each step in the demonstration. Group demonstration must frequently be supplemented by individual instruction because all learners are not likely to be at the same stage of development.

Proper discipline in the classroom is important. The instructor should not be a martinet but he must be a leader of men. He should be fair and impartial in his dealings with them, firm in his decisions, courteous, and generally interested in his men. One mark of a good instructor is knowing and using the names of his men. Sarcasm should be studiously avoided and humor should be wisely used. The instructor should never try to bluff. He should be willing to acknowledge a mistake and to give credit where credit is due. He should encourage his class to participate in the work, knowing that when his students want to take part in class discussion real interest has been created and the instruction is going well.

Men learn by doing. After a subject has been explained, demonstrated, and discussed, it should be applied, to fix it firmly in the mind of the student. Application is learning by doing.

Demonstration is particularly important in military subjects. It will do a man no good in the field to know the parts of a weapon if he cannot strip it for cleaning or apply an immediate and unhesitating remedy for a stoppage in its operation.

Application is of two types—individual performance and team performance. Both are important and the student should receive enough practice in each to know how to do what he is trying to do.

Thus on the rifle range the individual has a coach who corrects his firing position, his trigger squeeze, and other important aspects of the skill of firing a rifle. In close-order drill the student learns team work and the elements of discipline.

The instructor is also faced with the problem of examining his men and evaluating their progress. Many a good course of classroom instruction is marred by an unfair or careless examination. Tests may be oral or written, or they may be performance or observation tests. Each of these is particularly suited to certain situations, and the instructor should give careful consideration to the kind of test best suited to his subject. The purpose of examination is not to trip up the learner with trick questions but to determine the measure of his progress.

Just as in the physical world there are various kinds of measurements—length, area, cubic content, etc.—so there are various kinds of measurements of individuals. It may be that the instructor wants to measure the time performance of his students—whether, for example, they can make a wire-splice in five minutes. He may want to know whether the students know how to work as members of a team. Or he may want to measure the students' general information relative to the entire course. Different kinds of tests are useful in obtaining these different kinds of measurement. It is important that the best measurement technique be selected for the specific testing purpose at hand.

Written examinations may be classified under two general types—essay and objective. The essay type is valuable in testing the student's ability to apply what he has learned to a specific situation. The objective, or question-and-answer type, tests the extent of the information he has acquired. In either of these, the test should call for specific answers and should be designed to evaluate the work of the student and his mastery of the subject under consideration.

Another form of instruction is the discussion and critique following the demonstration of a problem. For example, a class may have spent several hours in the field executing a combat problem or an exercise in extended order drill. At the conclusion of the exercise, the instructor will gather his men in some convenient place and discuss with them what was right and what was wrong in the execution of the problem. This fixes the material in the minds of the students as a lecture or even a training film could not. It is particularly adapted to military problems, as it is based on bringing the subject as close to field conditions as possible.

Classrooms do not have to be dull. The instructor who knows how to impart what knowledge he has and to progress with his students from one phase of a subject to the next is a far better teacher than the man who knows his subject but can't get it across to others.



# Morale

[Extract from an article, "Troop Leadership for Junior Officers," by Lieutenant John H. Thornton, Jr., Coast Artillery Corps, in the *Coast Artillery Journal* July-August 1943.]

GOOD WILL has been defined as the "sum of an infinite number of favorable impressions." The problem, then, for the young officer, is how to build up "favorable impressions" in the minds of the men of the command. Many approaches to the problem have been suggested.

The British, for example, urge young officers to remember the following eight commandments:

1. Give the men a sense of unity, all for one, one for all.
2. Put the men's interest first at all times.
3. Explain things to the men.
4. Do things with them. (British officers always take part in athletics with the enlisted men. One of the guiding principles of their leadership is the development of the spirit of the team.)
5. Be the champion of the men; fight for them; defend them always.
6. Know the men's names.
7. Make the salute a greeting between comrades and practice it religiously.
8. Be friendly with the men without being familiar.

Young officers find it most difficult in improving the morale of an organization to remember the paternalistic attitude which they must adopt; the same position as a stern father with his children. In this rôle they must be the father confessor of enlisted men. It is all-important that they be urged to come to their officers with important personal problems, knowing they will be guaranteed a sympathetic reception.

In the same respect, enlisted men must be instructed not to be afraid of bringing other complaints freely to their officers. Naturally, noncommissioned officers should weed out the complaints which are not important. But it is vital to the morale of any unit that the enlisted men know that they have a means of redress in matters of importance if they feel that they have been dealt with unjustly.

Orientation has come to be regarded as highly important in the maintenance of morale in the American Army, stemming from the natural questioning in the mind of a democratic citizen to know the reason "why" for everything he does. Frequent talks about "why" the fighting takes place, war aims, plans for a post-war world, are "musts" in any organization with a high morale.

In garrison and in the field, officers must fight continually to secure prompt deliverance of mail.

No other factor in a soldier's existence is so important as the prompt receipt of news from home. Officers often order home-town papers when a substantial number of men come from a particular community. In the field, it is a great help if officers contact friends and relatives of men who are not receiving mail, and request them to write.

After hours, the chaplain and special services officers should be utilized. An occasional party, social occasions where feminine companionship is provided, informally organized musical entertainment are morale builders. The discovery of an enlisted man who can play a musical instrument or is possessed of theatrical talent is a gold mine to a young officer.

Athletic teams are always aids to the preservation of morale. Americans are the most sports-minded people on the earth. This quality is a godsend to officers confronted with a morale problem. The equipment for softball or football is inexpensive and can be improvised if necessary. One over-zealous special services officer suggested the jawbone of an ass for a baseball bat, if things got too tight.

Insistence by young officers that enlisted men present a good appearance at all times is also a definite morale booster. They should require that the men look like soldiers, with brass polished, hair cut, shoes shined; to work on postures. It is no idle phrase that a good posture adds immeasurably to self-respect.

It is important that each officer guard the health of his enlisted men. Particularly stringent inspections must be made when the unit is in the field. Officers must not permit the enlisted men to go "to seed" once an outfit has moved into active position. Neatness, haircuts, daily shaving, regular bathing, must be insisted upon, if at all possible. Any deductions to self-respect will inevitably result in a lowering of morale.

Religious preferences of enlisted men will also be honored and facilities provided for their worship when possible. Officers must get to know and use the chaplain.

Like the sad clown, Pagliacci, it is always "smile, damn you, smile" for a junior officer. No matter how tough the going, or how hopeless the position, junior officers can exude nothing but cheerfulness and optimism under any circumstances. It remains for their spirit to "carry" the outfit along when the night is the darkest and the mess truck is stuck in the mud ten miles to the rear.



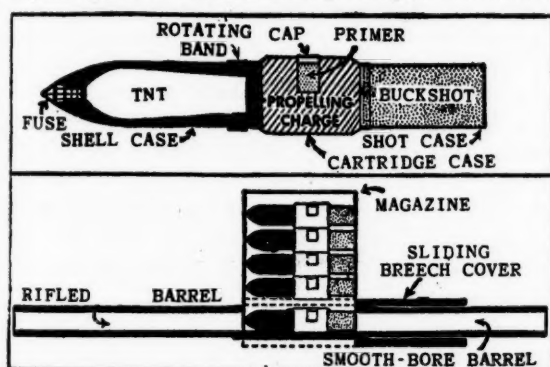
# MILITARY NOTES AROUND THE WORLD



## GERMANY

### *Recoilless Gun:*

The 105-mm "recoilless gun" used by the Germans in North Africa and Sicily as an antitank weapon operates on the same principle as the Davis



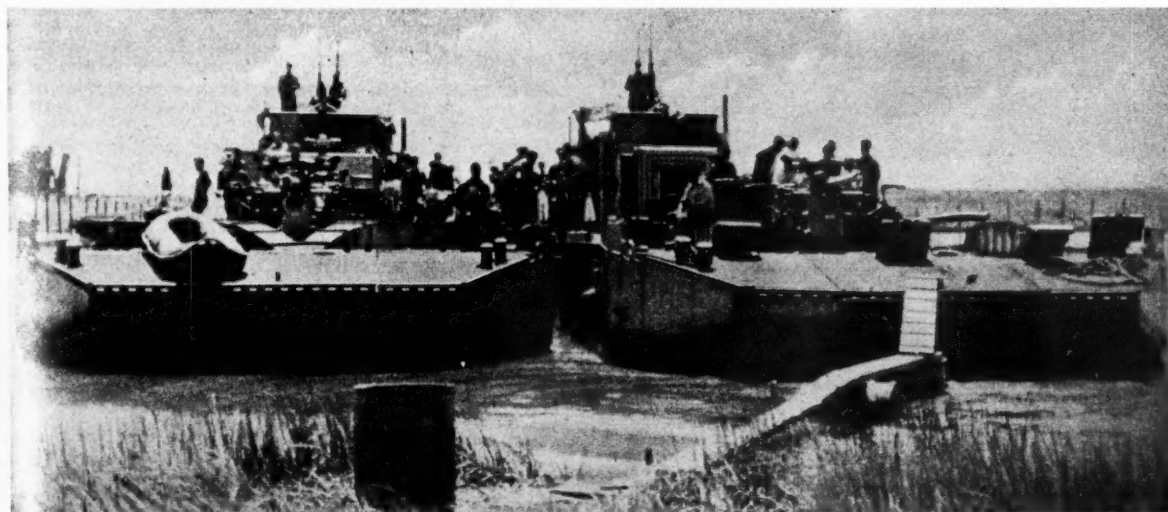
non-recoil gun, an American invention of World War I. Ordinarily, the pressure of the highly compressed gas formed by the burning powder in a gun pushes against the breech at one end and against a

movable plug, the projectile, at the other, with the result that the gun kicks back. It was conceived that recoil might be eliminated by providing two movable plugs and putting the powder charge between them. Both plugs would be pushed out and the recoil would be taken up by the second projectile.

The principle was embodied in the Davis non-recoil gun as follows (see diagram): A rifled barrel of about 2½ inches receives the projectile. Attached to its rear end is a smooth-bore barrel, receiving a cardboard container of buckshot. When the charge is fired the projectile leaves the forward muzzle as in any gun, while the buckshot (the cardboard container breaking up under the pressure) emerges from the rear muzzle. But while the shell has a range of a few thousand yards, the buckshot, encountering a lot more air resistance, harmlessly falls to the ground.

(Copyright 1943 by Field Publications. Reprinted by courtesy of newspaper PM.)

### *German Supply Vessels in the Black Sea:*



This type of vessel has been employed by the Germans to enable them to unload supplies for their troops along the shores of the Black Sea, where the water is very shallow. According to the German account, the greatest depth of the sea in the region of

the Kuban bridgehead was forty feet, and the average depth was only between six and seven feet. These boats could navigate the shallow water and move right up to the landing places.

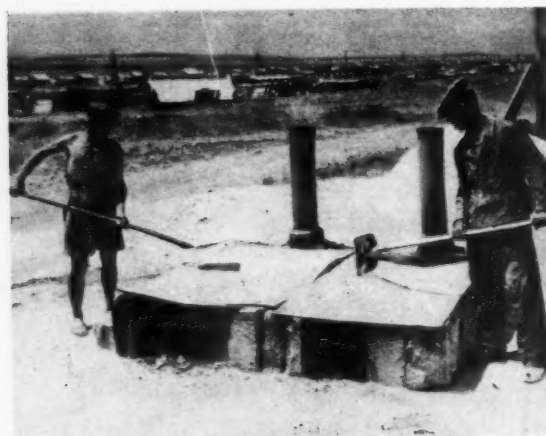
(*Wochenschau*, Essen, 8 September 1943)

*Control of Malaria in Russia:*

While the Germans were holding the bridgehead at the mouth of the Kuban River (the Taman Peninsula east of the Crimea) they found the marshes there a breeding ground for the malarial mosquito. Scientists were sent to determine the distribution of the pest and to mark out areas for treatment. In drums arranged like that in the first picture below, Paris green was mixed with ordinary road dust. The



dust was then thoroughly dried on such primitive ovens as those shown in the second picture, all moisture being removed to complete the mixture of the dust with the arsenic. Heavy, unarmed medical planes, flying low with fighter protection, then scattered long trails of the dust over the infested areas. The German report states that no more of the mosquito larvae are alive a couple of hours after treat-



ment of an area with the dust, which is harmless to human beings. With the aid of women assistants who sampled the blood of natives so that infected persons could be isolated, the Germans expected to eliminate the plague from the Kuban area.

(From *Kölnische Illustrierte Zeitung*,  
2 September 1943)

*The National Socialist Transport Corps:*

The National Socialist Transport Corps (NSKK) from very small beginning has grown into a mighty continent-embracing organization. Transport regiments have been employed on all fronts for the transportation of ammunition and fuel supplies for both the Army and the Air Corps as well as for hauling building materials for the "Todt Organization." An NSKK transport regiment employed in Africa in nearly two years of service carried 279,000 tons of supplies of all kinds a distance of 4,700,000 kilometers to various air bases. The men of this regiment not only had to cope with climatic problems, the desert, and the lack of water, but they also defended themselves so well in combat that 93 Iron Crosses for bravery were awarded. The training of leaders for the NSKK begins with the basic infantry training necessary for men going to the front. The locations of the garrisons sheltering the NSKK training battalions show the wide-spread training area of these transport groups—beside the Atlantic Wall, in Norway, on the eastern front, in the Balkans, in southern France, and inside Germany. They have become an inseparable part of the German military system.

(*Deutsche Zeitung in den Niederlanden*,  
Amsterdam, 8 July 1943)

*Employment of Foreigners:*

A German article of 31 July 1943 contains this interesting statement concerning the personnel employed in the units of the National Socialist Transport Corps (NSKK): "The NSKK units are compelled to employ foreigners in considerable numbers and can count on only a fraction of Germans or even Flemings. Frenchmen are seldom used, but many Russians and other nationalities are employed. Thus we find one unit composed of 103 Germans and 1,100 foreigners, the Germans acting as column commanders."

(*Deutsche Allgemeine Zeitung*, Berlin)

## GREAT BRITAIN

*Army Salvage Campaign:*

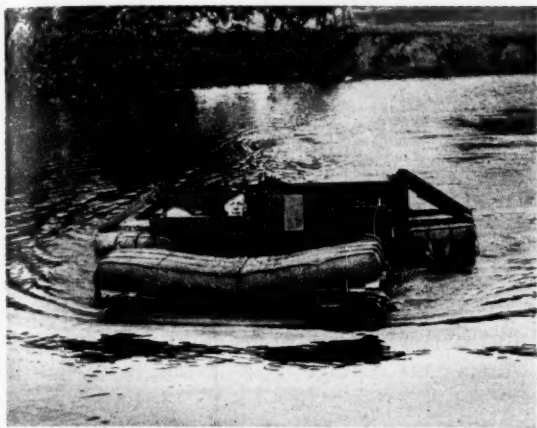
The British Army has its own salvage campaign. One command during 1942 returned enough paper to make ten thousand antiaircraft shell containers, forty million cartridge boxes, one million two hundred and fifty thousand mortar shell carriers—and enough scrap metal for two destroyers, one hundred cruiser tanks, four thousand five-hundred pound bombs, two hundred 3.7-inch antiaircraft guns, five hundred naval mines, and the firing of one hundred and twenty-five broadsides from a battleship.

(*Britain*, British Information Services,  
New York, November 1943.)



*An Amphibious Bren-gun Carrier:*

Army vehicles turned amphibians are becoming a commonplace in this war. These pictures, taken at a school of military engineering in the north of Eng-



land, show the British Bren-gun carrier equipped for swimming rivers. The rotating caterpillar tracks are used for steering when the carrier is afloat. In



the description accompanying these pictures, nothing was said of the contents of the "mattresses" attached to the sides and ends of the vehicle.

(From *The Illustrated London News*)

*Rescue of Airmen at Sea:*

The Royal Air Force is now using a high-speed launch for rescuing airmen from the sea. It is guided to the position by radio phone or wireless from aircraft. For getting the airmen aboard, a weighted net ladder is thrown overboard up which an uninjured man can climb. Should the man be injured, a stretcher is lowered into the water, passed underneath him, and then hoisted on deck by a derrick. He is then taken to the sick bay which is fully equipped with medical supplies and where a fully qualified medical orderly is in attendance. The lives of many airmen have already been saved by these launches; in some cases they were over 150 miles from the coast.

(*Britain*, British Information Services, New York, November 1943.)

*Forward Observation Officers:*

Naval bombardment has provided a considerable part of the cover for Allied landings in the Mediterranean since Oran and Algiers. It is made possible by Bombardment Units, a new type of force.

Bombardment Units are formed from selected officers of the Royal Artillery. They are trained by Combined Operations and are known either as Forward Observation Officers or Bombardment Liaison Officers, the two duties being interchangeable.

Forward Observation Officers are the eyes of the naval artillery. They go into action with the forward troops in landing areas. They may go with commandos or they may be dropped by parachute or glider. Once on land, their job is to send wireless messages directing the fire of the naval guns. The Bombardment Liaison Officers, on the other end, have to interpret the wireless calls and help the gunnery officer to lay his guns on the target.

**U. S. S. R.***Production for War:*

It is not possible at this stage to evaluate the respective contributions of Russian industry and British and American lend-lease aid to the Russian victories. It is worth noting, however, that besides the thousands of airplanes, tanks, and lorries which Britain has sent to Russia, Britain and the United States had also sent some 830,000 tons of metals and machine tools by February, 1943.

Russian industry, extended and re-established in the Urals and Siberia, has put these raw materials to good use. Russian munition factories produced nearly 50 percent more in the first six months of 1943 than in the corresponding period of 1942. In "the most essential types of munitions," according to the Russian Deputy Commissioner for Munitions Industries, output was increased by 800 percent.

The result was felt in fire-power on the battle-front. General Sabennikov, the Russian commander on the Orel sector, said recently that his artillery barrage there was "at least ten times as dense as that at Verdun," while every yard of ground was covered on the average with two guns.

**JAPAN***Living Conditions of Japanese Soldiers:*

Australian soldiers, who are trained strictly in regard to hygiene, never cease to marvel at the filthy conditions which the Japanese soldiers tolerate. They think nothing of fouling their shelters and trenches. It has been a striking phenomenon at every place in New Guinea where the Japanese have fought, and it is curious in view of the undeniably clean habits of the Japanese in their own country.

(*The Times*, London)

## UNITED STATES

*Equipment Losses in Sicily:*

The War Department has released the percentages of certain important items of military equipment lost during the successful Sicilian campaign. In those operations we lost 13% of all the 155-mm howitzers we landed; 46% of all the 57-mm guns; 36% of the motor carriages for our 75-mm guns; 22% of the carriages for our 105-mm howitzers; and 54% of the carriages for our 37-mm guns. We also lost 7% of our light tanks; 8% of our medium tanks; and nearly 13% of our 37-mm guns.

(*The Army Officer* October 1943)

*Evacuation of Wounded in the Southwest Pacific:*

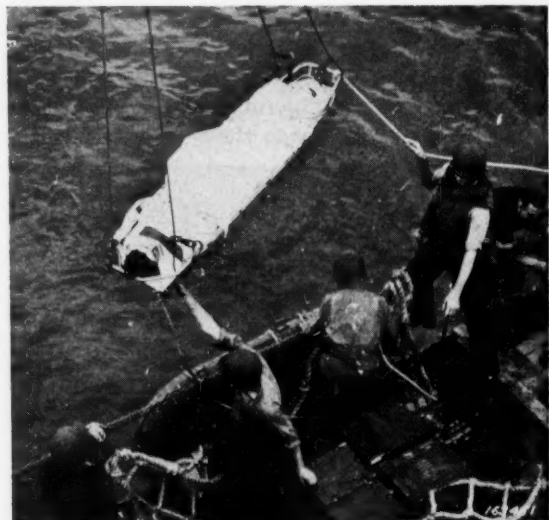
Litter bearers handing a loaded litter up a fifty degree slope to an aid station on Guadalcanal. Ropes were strung between the trees to help the bearers, for the ground is a mass of muck which never dries. Over this terrain one litter crew could work only thirty to fifty yards without relief. This trail ran through a pocket of enemy troops making it necessary for the crews to carry arms to ward off attacks from machine guns and snipers.



Native carriers transporting wounded from a battle in New Guinea.



Injured men being carefully carried ashore in New Caledonia.



Method of lifting a wounded man to shipboard.

(*Signal Corps Photos*)

## CANADA

*A Remedy for Seasickness:*

The Royal Canadian Navy has announced a capsule which is said to prevent or cure seasickness in three out of every four persons normally troubled by that malady, and to be equally effective against airsickness—a boon to airborne troops. The new discovery, the formula for which is secret, will also be of great value for invasion troops who are carried on landing craft for only a few hours with no time to develop sea immunity.

Last July, experiments comparable to those that have been reported from Canada were disclosed by the Engineer Amphibian Command at Camp Edwards, Massachusetts. These produced a capsule formula called "Motion Sickness Preventive; U. S. Army, Development Type," which is still undergoing test, but American fighting forces have not yet sponsored any one remedy.

(*News Reports*)

# FOREIGN MILITARY DIGESTS

## *Cooperation of All Arms in Attack*

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article in *Krasnaya Zvezda* 20 July 1943.]

THE ADVANCE of our troops in regions north, east, and south of Orel is continuing. The battle is going on in rear of the enemy's defense zone, which has been penetrated at various places. Taking advantage of terrain, the Germans have created here a solid defense consisting of many lines. The fact that our troops in the very first days of attack succeeded in penetrating such a defense on a wide front and moving into its rear for some dozens of kilometers bears witness to our army's power and is proof of the important success of the offensive. The problem now is to keep up the tempo of attack and attain complete destruction of hostile defense in the designated directions.

The solution of this problem largely depends on skilful use of all means of breakthrough, especially on artillery and tanks attacking along with infantry, and on aircraft supporting them from the air. Not one of these arms is able independently to overcome the resistance of the enemy, but under their joint pressure even the most solid defense cannot stand. Close cooperation of all types of troops, and still more, mastery, organization, and precision in realization of that cooperation on the battlefield—such is the first demand placed on the advancing forces.

Infantry and the tanks supporting it are the first echelon whose movement determines the general tempo of the attack and its final success. For this reason all means must be employed to assure the cohesion of infantry and tank action. The decisive role here belongs to our artillery. By its powerful, well-calculated, and well-placed fire it assured the achievement of the breakthrough of hostile defense in the first days of the attack. To the artillery now falls the responsibility of developing the success further.

Our attacking units must methodically chew through a deeply developed system of hostile defense, break through successive defensive lines, and at the same time beat off counterattacks by fairly large tank forces. Under these conditions it is essential to take all measures to accompany the attacking infantry with powerful artillery support in the entire depth of the breakthrough. High flexi-

bility in the use of effective artillery elements and the maximum massing of artillery fire—this is what is needed now in all stages of the attack. Having broken through hostile defense in one sector, the basic artillery elements must not be scattered, since there is a new fortified zone a dozen or less kilometers farther on for the destruction of which the most powerful artillery action is needed. The skilful organization of artillery attack calculated in great depth—such is the problem of the commander of the force of all arms and the artillery commander.

Using massed artillery, it is essential to provide mobile artillery means to a sufficient degree to combat formations of infantry and tanks. This artillery will be able to conduct combat against the enemy's fortified firing points and counterattacking tanks. A great role is played here by self-propelled guns, having high fire power and being capable of flexible maneuver on the battlefield. These guns have proved themselves in battle, but it would be wrong to try to solve with their help alone all the problems imposed on artillery. Accompanying guns fulfill limited tasks; they are necessary where quick striking of targets is required. Flexible maneuver, suddenness, cunning—that is the basis of the tactics of self-propelled guns advancing with the combat formations of attacking infantry and tanks. Besides self-propelled guns, mechanically towed guns and batteries must move close behind the infantry. All this increases the striking strength of attacking units and enhances their stability against counterattacks by hostile tanks.

In the course of offensive battles, the most serious attention must be turned to the cooperation of tanks with infantry and artillery. Their actions must be strictly harmonized in all the stages of the battle. Tanks engaged in the breakthrough supporting the attack of the infantry, have great fire power and can fulfill various tasks, down to destroying log-and-earth strong-points. But this does not mean that tanks do not need artillery support, for such support is absolutely necessary. It is a matter of joint blows of tanks and artillery. The tank attack must always be preceded by artillery preparation against the objective to be attacked, whether on the forward edge or in the rear of the enemy position. This gives tanks the chance to approach the target and complete its destruction by fire and treads. In short, relying on the support of artillery and mortars, tanks



can fully use their mobility and fire power in the very midst of the hostile position and resolve the tasks imposed on them with minimum losses.

Infantry, using all the power of its fire, must keep up with the tanks and quickly consolidate the success attained by the latter. The least gap between infantry and tanks may lead to the enemy's cutting them off from each other. This must never be permitted.

While continuing our offensive, it is also necessary to anticipate new attempts by the German command to stop the movement of our units with the help of large tank forces. Massed use of artillery, tanks, and aircraft is the reliable method of parrying such enemy attempts. Besides that, it is essential to take care of the rapid and firm consolidation of infantry in newly won positions, and the increase in its anti-tank resistance.

Our air force is displaying great activity in attack battles, cooperating closely with ground troops. This cooperation of aviation with infantry, tanks, and artillery must also be maintained in the future as the offensive develops in depth. It is clear that the enemy will throw into the battle large masses of aircraft and will try to weaken and break up our pressure by means of air blows. The duty of our fliers and the anti-aircraft cooperating with them is to provide reliable protection to the combat formations of friendly troops against enemy air blows and to defeat German aviation in its attempt to hinder our advance.

The task of our air force is to attack the enemy and win complete domination of the sky over the battlefield.

Units of our Army have effective means of attack. The fighting power of all types of our troops is great. Combining their efforts, they can and must crush any defense of the enemy.

### ***Some Factors Affecting Military Morale***

[A digest of an article by Major Frederic Evans, M. B. E., British Army, in *The Journal of the Royal United Service Institution* (Great Britain).]

ALL LEADERS should have some conception of the individual make-up of the soldier if their leadership is to be not only inspiring but also understanding. There is, first, the need that leaders should be *in loco parentis* to their men. This attitude is important not only because it insures, as far as possible in war, the well-being, health, and fitness of the troops but also because it recognizes a basic need deep in the subconscious mind of every human being. To the young child the father is all knowing, all powerful, all beneficent. To the young soldier this subconscious son-and-father relationship is essential if he is to be sustained in the trials and struggles of modern war.

Leaders, therefore, should know their men and be interested in them as individuals. They should help them in their troubles and get them to talk about their problems. That does not mean being soft and namby-pamby. When the supreme emergency comes and men are told that they have to hold a post to the death, it will come best from someone who has fathered them and who will remain with them to the last. This bond is vital in the best leadership of men. It is tacitly implied in the regulations or traditions concerned with management of men.

No man likes to feel himself inferior in any relationship or situation. If life has developed in him a sense of inferiority, he may express it either in an exaggerated effort to appear superior or in an attitude in which initiative and pride in self are absent. Both these manifestations are bad for soldiers.

What we must aim at is development of individual self-esteem to produce a self-respect and a standard of behavior consistent with an army of proud crusaders in a great cause. Undoubtedly the individual man, apart from his social consciousness as a member of an army, would flee from the wrath of the enemy. It is the realization that to do this would bring upon him the contempt of his fellows and will "let them down" which supports him in his inhibition of the primitive urge to seek his own safety.

Therefore in our training we must be careful not to damage these individual feelings of self-esteem. Recruits should not have their self-pride and individuality badgered out of them. They should be brought into the army as members of a great communal organization acting for a great purpose. Inculcation of this inward spirit is vastly more important than development of an orthodoxy of drills, however superficially perfect, imposed from outside.

Good discipline is inherent in the maintenance of high morale among troops. In all collective action it is necessary to have a basic structure of discipline wherein individual tendencies are organized to act in unity and for the general good. The aim will be to weld individuals into a group imbued with the same aims and trained to act as a team in response to commands. At the same time individual values have to be recognized and initiative encouraged so long as they operate in the interests of the group. "Comrades in arms" perhaps expresses this idea best.

Military discipline must be founded upon good will and in voluntary subjection of individual tendencies to achievement of the common aim. Thus, under the inspiration of a great crusading urge, voluntary subjection to discipline and arousing of enthusiasm in training can be accomplished even among men accustomed to take only an individualist point of view. Outward and visible discipline can thus be the expression of an inward and spiritual purpose.

In spite of high purpose, however, delinquencies will occur. But such delinquencies are less likely to

be fundamentally serious than those occurring among men disciplined only through rigid outward control. Petty punishments in large numbers are seldom effective and tend to produce discontent. It is better to apply the first offender principle and to award fewer punishments of greater severity to troops who do not respond to considerate treatment. Few and stiff, rather than many and small, should describe punishment in the army. Officers and non-commissioned officers alike should remember that their efficiency is not reflected in the number of men they "crime," but in their capacity to lead willing men as cooperators in a great cause. This should not mean softness in discipline. Orders, when given, must be obeyed with alacrity; but much depends upon how they are given and the qualities of the leaders giving them. Good discipline cuts both ways. It imposes an obligation upon those ordered and also calls for skill, judgment, and efficiency in those who give the orders.

When in contact with the enemy, especially for the first time, fear reactions are certain to be felt by most soldiers. This is quite natural and does not necessarily represent a condition which need reduce their fighting efficiency. With the right mass psychology, the social consciousness of the army that it must stand together to meet the foe will sustain the fighting community. Its standards will be clearly sensed by all who have been well-trained.

Nevertheless something must be done to take the first shock of the fear reaction. The best antidote to fear is action—a job to do—preferably in connection with the work of defense or attack. If troops have to withstand passively the pounding of the enemy, they are more likely to be unnerved by it than if they are actively engaged in doing something to prepare them to hit back. This is where good leadership will come in. If an objective is to be gained, then active conference over the methods to be followed will be invaluable. Concealment; use of cover; use of tricks to deceive the enemy; study of the land ahead by patrols; wiring; digging strongpoints, rifle pits, or slit trenches; cooking food or making hot drinks if this is possible; study of maps—these and similar activities will keep the men's minds positively engaged in devising ways and means of surmounting the problems before them. In this war more than in any other the individual soldier has opportunity of showing initiative and even qualities of leadership. Always should it be remembered that action is the best antidote to fear. But this action must obviously be concerned with the movements in hand.

In these preparations the officers should take a full part. Example is better than precept. So long as he does not prejudice his position of command, the more the officer will do with his men in these circumstances the better. Nothing strengthens the father-son link between an officer and his men

more than his complete identification with them in times of stress. This will add to his standing and his powers of leadership with the men rather than reduce them. In these active measures, officers can demonstrate as they can in no other way their powers of leadership. Leadership in action rather than in words is always more effective and more real.

During training, some men will develop certain morbid psychological conditions. They will be comparatively few in number, but they must be dealt with intelligently to prevent them from becoming centers of discontent or depression. There are, in every command, psychologists specially trained to assist with such cases; and their advice should always be sought by the medical officer. In this way, also, early knowledge can be secured of psychological trends among worried individuals and to some extent in the communities of soldiers.

Malaise, ennui, boredom—call it what you will—is, in war, an important cause of reduced efficiency and drive among soldiers. Here, again, action is the remedy. But the action, after necessary standards in routine have been attained, must provide variety and development. Repetition in what is already thoroughly known will increase boredom rather than reduce it. The skillful leader will devise new applications and new coordinations of the skills acquired in training. In activities of this kind the precept of the lecture or the demonstration can be activated until it becomes part-and-parcel of the mental and physical make-up of the participants.

Leisure hours must be provided not only for reasons of war boredom but also to occupy the bodies and minds of the men in social rather than anti-social practices. It has been shown how well-organized facilities to provide for the soldier's leisure hours have resulted in great reductions in convictions for drunkenness and in the incidence of venereal diseases.

One further word about training. This must be a matter more of action than of words, of things handled rather than of technical terms only half understood. The lecture must be subordinate to the actual thing. Demonstration and handling, doing, and being are fundamental in training the soldier. This is a war of machines. The soldier must learn to be at ease with the machine he handles. In the tension of action against the enemy, his confidence in his machine—be it aircraft, ship, gun, tank, lorry, or rifle—will engender confidence in himself. Men are intensely interested in mechanical things. Our training should utilize this interest to the full and be based upon it rather than adventitious to it.

In such training much more must be done to accustom the soldier to the crash of noises inseparable from a modern battle. Clearly our new armies must become inured to noise. Their preoccupation with their machines or in purposeful activity will go a



long way towards preventing the thunder of war from breaking down their nerves.

The soldier must be directed toward extrovert things. He must, in his own consciousness, live from day to day rather than, in anticipation, die a thousand deaths. Everything possible to develop the soldier's extrovert expressions should be done. This is the safety valve through which his fears and anxieties can escape.

Much could be said of the dangers of so-called "shell-shock" in troops subjected to enemy attack. This should never be recognized in official speech, as it is a condition one may almost describe as contagious. Investigations made in the last war showed that real shell-shock was very rare and that usually it was induced in the soldier to excuse, in his own conscience, his unwillingness to face the enemy. When officers realized the simple psychology of so-called shell-shock, these conversions of quite natural fears into physical manifestations became much less frequent.

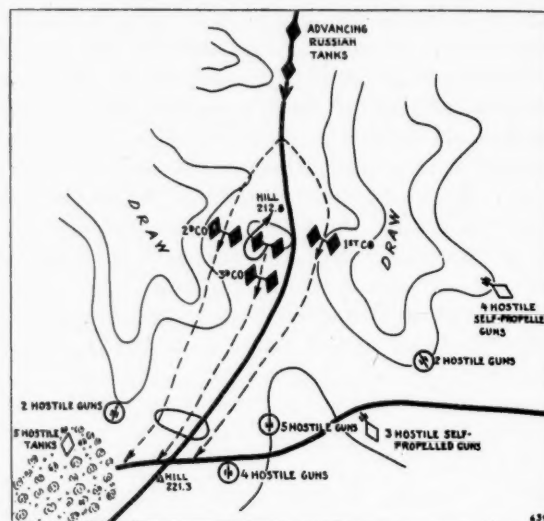
### Tempo of Tank Attack

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article by Lieutenant Colonel P. Kolomeytsev, Soviet Army, in *Krasnaya Zvezda* 12 September 1943.]

THE PROBLEM of the proper tempo of tank movement on the battlefield is one of the most vital and interesting in tank tactics. Every commander of a force of combined arms tries to employ his tanks to increase the speed of the offensive. But while it is true that tanks should advance as rapidly as possible in the attack, it is necessary at the same time to evaluate carefully the conditions under which those tanks will have to operate in the particular situation. Maneuver of tanks must be well thought out in advance and all possible security must be provided. The following examples of tank employment in actual combat will provide a basis for certain conclusions.

A detachment consisting of tanks, artillery, and motorized infantry under command of Mironov was given the task of exploiting the advance of our troops who had driven the enemy from the main line of defense. In accordance with this task, the detachment had to inflict a blow to the depth of twenty to twenty-five kilometers and reach a certain inhabited place, cutting off the routes of retreat of enemy troops. At dawn the detachment moved along the given march route (see top of sketch). The tank regiment, commanded by Major Millerov, moved in front in a marching column. The regiment was informed that Mironov's security and reconnaissance elements would operate ahead of it. Information about the enemy was very scanty. The staff of the detachment told the tank men only the following: our units, having driven the enemy from a certain line, are pressing him to the southwest.

The tank regiment was moving in the marching column by a forced march, having up front, two kilometers away, a small party of four tanks. When



this party reached the top of hill 212.8 (see sketch) it received flank fire from the left and retired again behind the hill. The commander of the regiment believed that up front the reconnaissance of the detachment (sent out by the detachment commander, Mironov) was active, but he did not find it there. As it was learned later, the reconnaissance and the detachment securing the movement were never dispatched. In the general haste this had been forgotten.

Leaving the tanks in concealment north of hill 212.8, the commander of the regiment decided to scout the enemy by fighting. This was accomplished by one tank company. As soon as the company crossed the hill, it at once fell into flank and cross fire, and was also subjected to strong bombardment from the air. Individual tanks reached hill 221.3, but soon the company was forced to withdraw. As a result of reconnaissance, not only the character of enemy defense was successfully made out, but his combat means were accurately determined. In the region of hill 221.3, thirteen guns and seven self-propelled enemy guns were disposed at various places, holding under fire hill 212.8 and the entire field south of it. Besides this, up to five German tanks were discovered on the right.

To break such a barrier by a frontal tank attack without artillery support would be difficult. Half an hour would be necessary for bringing up artillery and infantry to hill 212.8 and inflicting an organized blow on the enemy. Hostile defense was less strong to the right. Going around hill 212.8, our tanks were able, by moving along a hollow, to reach hill 221.3 with little damage and thus to appear almost in the rear of the enemy artillery positions.

Unfortunately, the commander of the detachment, upon arriving on hill 212.8, did not consider it necessary to lose time for the organization of cooperation.



Without waiting for the arrival of artillery and the mortars of a guard unit (only one battery had time to come up) he threw all the tanks into the attack along the road, that is, precisely along the field which was under heavy fire. Deploying into a line, the tank companies moved forward. As soon as they appeared from behind the crest of the hill, the enemy met them with fierce fire. Trying to race across the bombarded area, the tanks developed maximum speed and reached hill 221.3 fairly quickly. As a result the enemy was shaken and began to retire. Tactical success was attained, but at the cost of excessive losses. Several of our vehicles were knocked out of action which limited the possibilities of the tank unit's developing the attack.

This battle is a characteristic example of securing tempo of tank movement. It cannot be said that everything here was all right. Against the endeavor of the commander of the detachment to maintain high tempo of movement forward nothing should be said. Such was the demand of the situation. But the haste in committing tanks to the battle when they had encountered a strong antitank position deserves condemnation. It is not enough to demand that the tanks move forward without stopping. It is also necessary to secure their movement. The mistake of the commander of the detachment consisted first in not securing reconnaissance in the zone of the advance, for which reason the encounter with the enemy was unexpected. When the character of the hostile defense and the degree of its strength were accurately determined, the commander showed too much haste. He threw tanks into the attack without artillery support, of which there was enough but which had not been brought up in time. Why? Because the commander of the detachment, thinking of the rapidity of forward movement, forgot the other thing, the organization of the battle.

We dwell on this because such cases, unfortunately, still occur. Some commanders urge the tank personnel to "hurry up, hurry up," forgetting the most elementary principles of the organization of the battle, and that the time spent in the preparation for the battle is always repaid a hundredfold. We repeat: half an hour was needed for coordinating the cooperation of tanks with infantry and artillery. And this would have helped not only to inflict a blow on the enemy, but also to create conditions for an energetic and deep movement forward to the designated goal. Only haste could explain the fact that the tanks were thrown precisely in the direction where the density of antitank fire was greatest. Excessive haste hampered the freedom of maneuver of the tanks and they went straight through the wall of destructive fire, which led to losses.

Of course, in war, cases are possible in which it is necessary to move forward, disregarding everything. But nonetheless, in ninety cases out of a hundred it is possible to find time and means to take measures

which secure a high tempo of movement without excessive losses. The best method of economizing time is to take plenty of time in preparation of the operation and little in its realization. First, prepare the maneuver in every respect, and then execute it quickly without losing a minute, energetically striving to attain the designated goal. This is a more correct method of assuring a high tempo of advance than wholesale movement forward, when a rapid start inevitably changes to stalling around. The best operations carried out by our troops at various times and places are characterized by thorough preparation and swift action.

Let us return to the question of the tempo of tank attack. We shall cite another example from the combat action of the same tank unit. This time the commander of the regiment, Millerov, succeeded in executing an attack at a fairly high tempo. Let us describe briefly the situation and the terrain on which the attack was carried out.

Towards the enemy there ran a highway; to the right of the enemy, a railroad line. Along this line, according to the original plan, our tanks were to advance in order to come out at a certain inhabited place. In front of the inhabited place there were small thickets. Still nearer, abutting the railroad and running across the highway, stretched a long hill. Concealing his tanks behind this hill, Millerov found out by observation that along the axis of the road the Germans had several antitank guns. Besides that, signs of the presence of the enemy were noticed on the outskirts of a grove in front of the inhabited place which was to be attacked.

The commander of the regiment saw that movement of tanks along the railroad was difficult because of a steep embankment and narrow, deep cuts. He decided to move the tanks along the highway where the terrain was more suitable for their movement. To the right, along the railroad, the infantry was to proceed, its fire coordinated with that of the tanks. The commander figured on paralyzing the action of German antitank guns disposed along the highway by the suddenness and speed of the attack.

The secretly prepared and quickly executed attack actually did produce results. Rushing at full speed along the highway, the tanks at once crushed the antitank guns of the Germans, their crews fleeing. Without losing the tempo of movement, the tanks reached the grove and killed many Germans there. The enemy were eating at this time, and did not succeed in taking their places at the numerous guns. By-passing the grove to the right, the tanks moved toward the inhabited place. But here they encountered a swampy sector and the movement stopped. This gave the enemy a chance to bring his artillery into action, and to bombard the approaches to the inhabited place which was still about a kilometer away. Major Millerov did not advance recklessly. He retired his tanks to concealment behind the grove

and awaited the approach of his infantry. Then the infantry and tanks, now acting in close cooperation, attacked the inhabited place, and after some time drove the enemy out. The task was accomplished.

Let us recall the first example. There, swiftness of movement of tanks into the attack did not save them from losses. But in the second example, not only was there a high tempo of attack attained, but success was gained without loss. It is understandable why this was so. In the first case the element of surprise was missing, and besides, because of the excessive haste of the commander of the detachment, the tanks could not maneuver, although the situation demanded it. In the second case nobody hindered the tank commander in properly preparing the attack and in choosing a suitable direction for it. This took a little time, but the results were brilliant.

Of course, when the tanks reached the swamp it might have been best to look for a detour. But in general the commander sized up the situation correctly. The effect of the element of surprise had already ceased, and hence from there on it was necessary to attack differently, methodically, and in close cooperation with the infantry, which was skilfully done. In this the general tempo of the attack was not at all lost. Taking the inhabited place, the tank unit rushed forward. In some sectors the attack proceeded rather rapidly, in others it stopped to look around and prepare for further action. It was necessary in a number of places to stop longer for organization of cooperation with infantry and artillery in order to conduct a methodical advance, together with these elements, on the strongly fortified enemy. In a word, in all cases the commander acted in strict accordance with the resulting situation, not delaying, but also not showing too much haste.

By organization, not by haste, and by thinking through each step, a high tempo of attack by tanks is attained in whatever conditions they have to act.

### ***The Commanding Officer— The Heart of the Defense***

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a German article by war reporter Herpong in *Hamburger Fremdenblatt* 5 June 1943.]

A SLIT one-and-one-half-inches long in a piece of armor plate salvaged from a destroyed Soviet tank permits a view into the terrain immediately to the front. Crouched behind it watches a sentinel of an East Prussian infantry battalion. Not more than fifty yards in front, behind a parapet of yellow clay, the enemy waits. While the sentry watches, he hears behind him in the trench a firm step coming nearer. Everybody in this sector knows this step. The commander of the battalion is coming through the trench. His soldiers fear him a little; but for the most part they admire him greatly, and that has its special significance.

A shadow moves across the nearest parapet. The Major has arrived. He stops behind the armor plate. He wears the Knight's Cross, but he does not wear his other decorations, the German Cross in gold and the decorations for wounds in battle. Even without them his soldiers know that he has already been hit nine times, but they also know that after each wound he seems only to have become a few degrees harder. The sentry reports, quickly ending with: "In case of an attack it is my mission to give the alarm and to destroy the enemy in front of my position." He steps aside for a moment so that the Major has a full view through the slit in the armor plate.

Through his trenches, which wind along for several kilometers, the Major continues from sentry to sentry, from strongpoint to strongpoint. He looks into the dugouts; here he examines the condition of a machine gun, and there the manner in which the ammunition boxes are stored. It is regarded as a distinction if he continues without saying a word. At the advanced artillery observation post he studies, through the B.C. scope, the positions of the enemy and also the terrain behind them, looking for changes and new mounds of earth. In the sector of one platoon he orders a test alarm. The infantrymen rush, rifle in hand, from their dugouts into their battle positions. One behind the other they hurry through the narrow trenches. One squad must practice it over. In the meantime, the sand of the parapet spurts up repeatedly under the impact of bullets that come hissing from the enemy side. The Major talks with the company commander about the further consolidation of the position. He is interested in every single shovelful of earth. One trench is to be pushed somewhat farther into "no man's land." One vulnerable part has to be reinforced with wire and mines. A new communication trench has to be dug. Now, in daytime, nothing of this can be done because the enemy answers every shovelful of sand that is thrown out of the trench with a barrage from his mortars. Only at night can the work of improving the position be undertaken. In the morning all except the sentries rest in their small but solid dug-outs made of earth. They are quite comfortable and snug, except that the smell of decay, chloride of lime, and rotting wood, which clings to the trenches and mingles with the smoke from the stoves in the dug-outs, cannot be removed.

It is already afternoon when the Major, quite satisfied, returns to the command post. He thinks that in this position, which lies on a little ridge of solid clay running through the swamps, he can repulse any attack. Just the same, he has his men continuously at work improving their positions and he allows them only the minimum of time that they need for sleep. "Sweat saves blood." That is his motto, and already in the early afternoon the digging starts again in the trenches. The position demands renewed attention every day. As the clay permits no drop of



water to go through, the bottom of the trench has to be cleaned up after every little shower—and they are an almost daily event. Drainage ditches have to be emptied and sagging walls have to be reinforced. After the great spring thaws practically the entire position has to be rebuilt.

Behind a little mound of earth, almost invisible to the untrained eye, a tiny chimney sticks out. This is the command post of the battalion. The Major descends through the narrow shaft where a staircase has been improvised with sticks of birchwood. At the entrance to his dug-out he must squeeze past a runner who, with a big pump, is working to get out the water. Through a narrow door he enters the room which serves as his command post and living quarters. While the adjutant reports, the Major takes off his steel helmet, his wet boots, and his camouflage suit. He is "at home" and he makes himself comfortable. The room is only twelve by sixteen feet and about six feet high. The walls are covered with burlap and paper, and are decorated with a print of the *Führer* and a few other prints in improvised birch frames. There is also a captured Soviet flag. Two easy chairs made of birch branches, an upholstered chair captured by some company and presented to the commander, a table, a book-shelf, a radio, a field telephone, and an iron stove complete the inventory. On the walls hang mud-covered steel helmets, binoculars, weapons, and overcoats. Even electric light is provided here, beneath the torn and muddy ground. Its current comes from a battery which has been taken from a disabled Soviet tank.

Now, in the afternoon, the commander attends to the necessary paper work. The adjutant brings the papers for signature. They go through the papers that come in; reports are initialled; they discuss transfers to special training courses and schools, officers' assignments, and replacements; applications are examined and character references are given. The result of this year's Winter-Aid Drive is tabulated; altogether the battalion has contributed 200,000 Reichsmarks.

Then the Major turns his attention to administrative matters, to the improvement of the lines of supply, to the problems of the trains which are behind the lines. Plans for new construction are made. Behind the lines it is planned to build a subterranean "sauna" (Finnish steam bath), which at the same time would have to serve as a delousing room. The telephone rings several times, and in the corner the radio plays softly. From time to time the small window of the dug-out rattles when a shell comes crashing down not far away. Thus the afternoon and evening go by. A runner brings mail and newspapers. New complete silence reigns in the little room except for the occasional clatter of plates from behind the door where the orderly warms over the dinner which has been brought forward. At the entrance the pump groans again.

Then Karl, in normal times an orderly but in battle a runner, appears with the dinner. It is now 2200. They listen to the army communiqué, and then follows a short hour of rest.

At 2300 the appointed time has come when the Major gets ready for the night visit to the forward lines. He goes out alone. Outside things have become lively again. It is the time for the scouting patrols and the raiding detachments. There is the rumbling sound of an artillery salvo, heavy, long-range artillery fire, and the lashing report and whir of machine-gun bursts. Cautiously the Major makes his way through the shell-holes toward the trenches. Extreme care is necessary. Repeatedly our own troops as well as the enemy have laid mines in this area, which has changed hands several times. Wire entanglements and deep swamp holes have to be passed. Destroyed tanks and wrecks of airplanes lie between the tree stumps. In between, like big, dirty snowflakes, are thousands of leaflets. The air all around is filled with the stench of decay, and always the whistling, screaming, rumbling, and thundering of the infantry weapons and the artillery fire.

Suddenly there are shadows ahead. The commander has reached a work detail of his fusiliers. They are digging a communication trench to an advanced strongpoint and have to cross a depression in the terrain which is under enemy observation and only a hundred yards from his lines. The Major receives their report and gives the platoon leader (a sergeant) further instructions as to work on the trench. It goes right through a minefield. Then the Major continues to a position where they are putting up wire obstacles in front of the lines. The Major, with his unconcerned attitude, is a shining example for his soldiers; God help the man who tries to shirk a dangerous duty. In such cases he shows no mercy. War is a hard profession which requires stout hearts.

The commander crawls back to the trench. Everywhere he receives reports, and thus arrives at the left flank. From this point a scouting patrol had gone forward. They carry a walkie-talkie along and report from time to time. Beside the Major the company commander and a medical officer are waiting. All around chatter the machine guns.

Half an hour later four figures come panting through the darkness and jump into the trench. The patrol is back. In the command post of the company commander the fusiliers report what they have found out. The Major is not entirely satisfied with the work of the patrol. The radio operator—this was the first time he had gone along—had not reported frequently enough. The commander demands a lot, and does not hold back with his comments. But then he gives every man a bar of chocolate. Greatly impressed, but proud and happy, the four men take leave, and go shivering in the cool night air to their posts to join their comrades.

In the first light of the new day, at about 0300, the



Major returns to his command post. He reports to the regiment the result of the patrol, and then he too, lies down to rest. One day more of trench warfare is over. Another day like so many others, here on the defensive on the Northern Front, south of Lake Ladoga.

The soul of the resistance in this sector is the battalion commander, who, fully aware of his responsibility, arms himself and his fusiliers for the coming hours of danger. Severe discipline and fearlessness on all occasions, relentless fulfillment of duty to the end, and intense love for the Führer and country are the guiding principles in his education. The numerous battles which he has fought have shown the Major that his principles are sound. He also knows how to awaken in his East Prussians the high sense of devotion and attention to duty.

### **Artillery Counter-Preparation**

[Translated for the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article by Colonel E. Levit, Soviet Army, in *Krasnaya Zvezda* 24 July 1943.]

QUESTIONS of artillery counter-preparation have recently been absorbing the attention not only of artillery commanders but also of commanders of units of combined arms. This is not accidental. Experience has shown that by disrupting the enemy's first general attack his entire offensive operation is thereby also disrupted. In this, artillery counter-preparation has become the decisive factor in disrupting the enemy attack.

In preparing to repel the enemy offensive in the Orel-Kursk sector we were firmly convinced that during the artillery counter-preparation the enemy artillery and mortars must first be placed under fire. Of course it was also necessary to conduct fire against enemy concentrations, command posts, and centers of communication, but these were planned as supplementary missions. The estimate was as follows: if our artillery will effectively silence the enemy artillery and mortars, then the enemy infantry and tanks will be deprived of fire preparation, and the intended enemy attack will be weakened to a maximum degree.

On the basis of this estimate the plan of artillery counter-preparation was made in the artillery units long before the battle began. This plan was communicated down to battery commanders who developed it in detail. On the map of every battery commander were indicated the hostile artillery and mortar positions against which he was to conduct fire. The commander knew that at the given signal his battery was to fire on the determined target a certain length of time and a certain number of rounds.

It is, of course, understood that the plan of the artillery counter-preparation was not a permanently established dogma in all its ramifications. The plan

was re-examined and changed on the basis of the daily analysis of reconnaissance data. Particularly, the estimate of enemy firing positions was treated with the greatest reserve in order thus to establish the location of the actual, the alternate, and the simulated enemy positions.

It is, however, not enough to plan the artillery counter-preparation and to correct this plan skilfully. It is also necessary to determine faultlessly the precise moment when the plan is to be put into effect. A premature, as well as a belated, artillery counter-preparation will not produce the desired results. The commander must have precise information on when the enemy offensive action is to begin. In this matter, our own reconnaissance data were checked with information obtained from prisoners. On the basis of this the signal for the artillery counter-preparation was given. Let us examine this action.

Our fire was conducted as follows. At first, the entire artillery participating in the action fired for five minutes on the enemy batteries. As indicated above, the targets, the tempo of the fire, and the number of rounds—all this was determined earlier. Immediately following this a twenty-minute fire against the same targets was conducted by a considerable portion of available artillery. During the same period the sectors of hostile infantry and tank concentrations were also taken under fire. Our bombardment aviation was bombing the enemy command posts and centers of communication.

What was the result? In one sector alone our artillery silenced a large number of enemy batteries and observation posts. Such a powerful blow could not but affect the German artillery preparation. The enemy did begin his preparation on the entire front, but his fire was infrequent and disorganized. Even those German batteries which were not registered on by us, and consequently were not included in our plan for artillery counter-preparation, were acting in a highly disorganized manner.

Large tank forces participated in the enemy offensive, and the hostile action was supported by many aircraft which attacked our outer edge in groups of ten to fifteen planes. However, the Germans could not break through our front. This was because at the very beginning of the German offensive a part of the enemy artillery was paralyzed and unable to provide support for the attacking forces.

What conclusions may be drawn from the example of the successful artillery counter-preparation in the Orel-Kursk sector? As practice shows, the fire system of the defending side can be disrupted to a considerable degree only by artillery. Thanks to our artillery counter-preparation the Germans were unable to disrupt our fire system to any degree, and this permitted our defending forces to meet the hostile infantry and tanks with confidence. Frequently the German infantry and tanks walked into fire pockets and ambushes prepared for them. Once more it was

shown that a breakthrough of an organized position cannot be successfully accomplished if the artillery is weak. Therefore, the silencing of the artillery of the attacking enemy is a task of first rate importance for the defenders during the opening period of battle.

Effectiveness of artillery counter-preparation first of all depends on the thoroughness of the reconnaissance of enemy artillery. In the Orel-Kursk sector our reconnaissance succeeded in correctly determining the dispositions of the enemy batteries and in communicating all changes in time. This permitted us to make timely corrections in the plan for artillery counter-preparation, and on the day when this plan was put into effect it proved to be correct.

Skilfully conducted artillery counter-preparation compelled the enemy to change his tactics in a manner unfavorable to him. Thus, for instance, inasmuch as the hostile artillery and mortars were silenced effectively and on time, the Germans were constrained to commit practically all of their bombardment aircraft to action against the outer edge of our defense. It is understood that this condition considerably reduced the German air action against our rear installations and permitted us to maneuver our forces in a more effective manner.

In this case we have examined the general artillery counter-preparation on a large scale. However, practical experience suggests that it should be organized during defensive action also when action is not effected either by a corps or another large unit. Such a small-scale artillery counter-preparation is organized in those instances when the enemy is preparing for active operations on a small sector of the front, or when enemy counterattacks are expected after our units capture some particular positions. However, in this case also reconnaissance must be the very soul of the artillery counter-preparation.

In conclusion we note the following. In planning for the artillery counter-preparation, it is absolutely necessary to be prepared for a situation when we shall fail in anticipating the hostile artillery preparation, and thus have to begin our fire amidst his. For this eventuality a special plan and special signals should be made available. It must be emphasized that a niggardly approach must be eliminated in organizing the artillery counter-preparation. To such action must be committed the greatest possible number of the artillery and mortar batteries. Only in this manner will the mission be thoroughly executed.

### Tank Tactics

[An extract, reprinted from *The Tank* (Great Britain) August 1943, from the book, *The German Army of Today* by Wilhelm Necker, published by Lindsay Drummond, Ltd., 6/7 Buckingham Street, London, W.]

#### The Original Tactics

THE TANK introduced speed into modern warfare. The modern German army did not use the tank

purely as a means for protecting infantry against machine guns. It was the tank, in conjunction with the airplane, that had to make the breakthrough and leave the mopping-up operations to the infantry proper, who were following up. But the tank is a vulnerable weapon and has to select the weaker spots of the front; only after the breakthrough has been effected at one of these spots does its main task begin; to envelop the enemy, to attack him from the flanks and from the rear where his weakest spots are to be found. Before the enemy has been able to assemble his reserves, his communications should be interrupted and his main forces surrounded and disabled.

The tactics of the first breakthrough were carried out to perfection in France. The tanks attacked in waves, the second supporting the first, destroying opposing machine guns and antitank artillery [Figure 1]. The first wave had to penetrate enemy lines till artillery positions were reached, and then

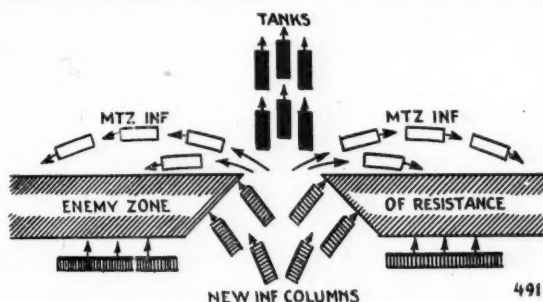


FIGURE 1.

to destroy them. The following waves dealt with enemy infantry and helped their own infantry (motorized first) to widen the gaps which the tanks had opened. The tanks were accompanied by all the other units of the tank division; the antitank troops, engineers and antiaircraft units, etc.

#### The Modified Tactics

The German tacticians used these tactics against Russia at the beginning of the invasion, but as soon as the Soviets learned how to avoid consequences of a tank breakthrough, the Germans were compelled to change their tank tactics. The same happened in Africa, especially in Tunisia. In the wide open spaces of the desert, tanks cannot approach without being spotted; the moment of surprise is lost. They found that the tanks frequently had to support infantry which was counterattacking against lost positions, and that tanks, therefore, having to attack at the "speed" of infantry, lost their main weapon: speed. As the slow tank is very vulnerable against artillery fire, especially the fire of antitank guns, losses must have been very heavy. These were some of the reasons for the modification of German tank tactics. But the main reason was that the Russian tanks in 1941 were not organized as operational units, but distributed amongst infantry divisions at a rate of 80-100 to each division. At this time Russian tanks

were mostly not equipped with wireless sets; as their tanks could not communicate, they could not often be used in concentrated blocks. By 1942, Russian tanks were organized in new operational units and the German panzer division had to face an equally well-organized tank force, which made its task much more difficult. New tactics, therefore, had to be found.

### The Pulk in Russia

In 1942, a new formation was invented, the so-called "box formation," or, as the Russians called it, "the pig." The official German name is *Pulk*, meaning tanks and motor lorries (*Panzer und Lastkraftwagen*).

The *Pulk* is either a wedge of tanks or a quadrangle of tanks, or a combination of both. The tanks advance in the form of a wedge, with the point directed against the enemy positions; inside the wedge go infantry columns in motor lorries [Figure 2]. The point is formed with the strongest tanks, the sides partly by tanks and partly by motorized artillery

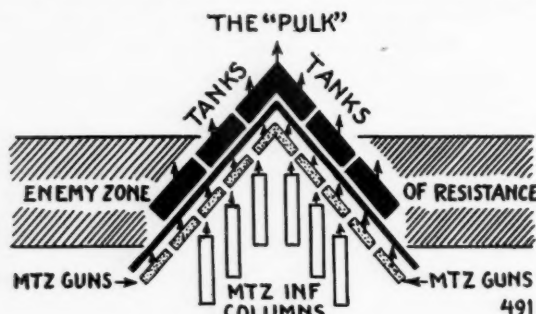


FIGURE 2.

to protect the infantry inside the wedge. The point of the wedge pierces the enemy position and the outer sides of the wedge automatically widen the gap. When the last tanks and motorized artillery—including antitank artillery and antiaircraft artillery—have penetrated the enemy positions, the infantry, shielded by the tanks, is already well inside the enemy position.

This formation has obviously one great advantage. The Russians had learned how to separate the tanks from the following infantry. Often after the first wave of enemy tanks had pierced their lines, the Russians were able to close the gap they had created, and cut them off from the supporting infantry, which they were able to repel with a few machine guns. The tanks could then be destroyed by the antitank artillery, and the infantry had to attack without the help of the tanks. If the *Pulk* attacks, this danger is now avoided. The infantry pierces the position without being hindered by the enemy infantry and is able to fan out behind the pierced positions.

The wedge of the tanks can also be modified if it is not known with certainty where the weakest spot in the enemy line is. The tanks can first advance in the form of a quadrangle, consisting of a strong line of tanks at the head, the two sides being composed of

tanks and artillery, with the infantry inside [Figure 3]. The back of this quadrangle is open. During the

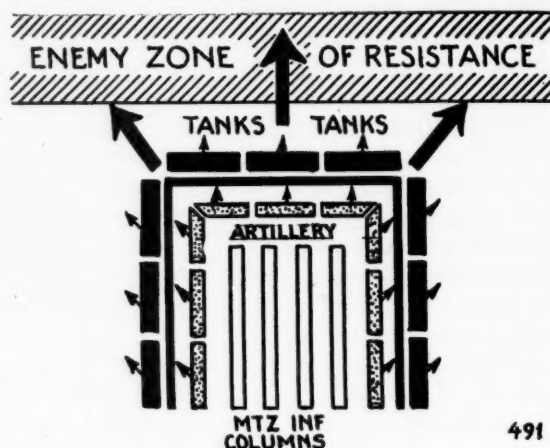


FIGURE 3.

advance the whole formation can alter its direction and use the left or the right point of the quadrangle as a wedge. Thus the whole weight of the formation can be concentrated upon this point, and will now advance like the original wedge.

But this formation has some disadvantages. The enemy will lay the whole weight of his fire upon the point of the wedge or the comparatively small attacking line of the wedge, whilst the rest of the enemy's artillery bombards the infantry inside the wedge of the quadrangle.

In the original form of tank attack, the tanks advanced at the critical moment comparatively slowly across country, whereas the motorized infantry advanced with full speed when the roads were cleared. The tanks avoided losses with their heavy armor, and the transport carriers of the infantry with their higher speed on roads.

In the *Pulk* the whole formation has only one speed; the speed of the slow-moving tanks. While the tanks battle with the enemy defenses, the motorized infantry inside the wedge cannot exploit its weapons and the fire power of its speed. It is constantly exposed to the fire of the enemy. If the tank attack should be successfully resisted and the spearhead of the *Pulk* broken, the infantry has to retreat under unfavorable conditions, whereas in the original form of tank attack in waves which broke the enemy lines before the infantry advanced, motorized infantry were able to exploit its speed.

The *Pulk* or *Mot-Pulk* (mot-motorized) was often mentioned in the German Press of 1942, but later on it seems that the Germans regretted the publicity which was given to it. In August, 1942, Goebbels' weekly, *Das Reich*, published a semi-humorous article on the *Pulk* by the well-known Nazi journalist, Schwarz van Berg.

He wrote ironically:

"It is a heap of motorized vehicles, tanks, armored



transport vehicles for soldiers, motorized batteries, antitank guns and AA guns and the allotted supply lorries and repair shops—a modern *laager* of steel. This *Pulk* is a moving square; as soon as the enemy's front is broken, it pushes into the hinterland of the enemy without waiting for contact with other troops, it turns with ease in every direction, and can fire in every direction. It sends out patrols here and there, and is, if necessary, supplied by air. This *Mot-Pulk* is said to be an invention of Rommel."

The writer goes on to say that the *Pulk* represents no single solution, nor an all-important tactical invention, and that the Germans continue to put their faith in the combined operations of every service and staff operation. This alone gives the soldier the feeling of absolute superiority.

The author did not deny the existence of the *Pulk*, which had been given great publicity, nor did he confirm it; but the emphasis which he laid on the fact that the *Pulk* is not alone all-powerful but only one means amongst others, is a further confirmation of the importance which the Germans place on combined operations.

#### The Change in North Africa

This departure from the original tactics can also be observed in Africa. It was from here that the first messages came about the "Tiger" tank, the 60-ton tank which is said to have an armor of seven inches and an 88-mm gun. This tank will, of course, be slow. It will be an infantry tank, a model which the Germans did not consider to be desirable before the war. Infantry either had to have the speed of the tank, or to find their own way through enemy defenses. Under no circumstances should the speed of the tank be reduced to that of the "foot-slogging" infantry.

In African deserts, tanks are visible from a great distance; therefore, they require a greater speed than for any other country. They have also to be more numerous in order to divert the artillery fire of the enemy. After the battle of El Alamein it became increasingly difficult for the Germans to meet these requirements. They seemed to replace part of their swift light and medium tanks as quickly as possible by fewer very heavy tanks which can stand practically any fire.

These tanks have to accompany infantry and infantry assaults. The first account of these new tactics can be found in an article of a "P.C." man (propaganda company man) in the *Völkischer Beobachter* of 25 January 1943. Here infantry, mountain riflemen, are described as storming the first positions, and the tanks and motorized infantry (panzer grenadiers) having to aid the attack. With a quick initial assault, the mountain troops go over their own barbed wire and minefields, and attack. They have to battle for hours for each foot of ground in order to capture the mountain pass road. This is,

of course, just the opposite of the usual German attack.

Slowly the outflanking succeeds, but firstly the many antitank guns and machine-gun nests have to be crushed: "Now comes the hour of the tanks. They attack, in spite of the narrow road and the thick undergrowth, which is anything but favorable for this kind of attack.

"The enemy artillery lays his salvos accurately on the road. The tanks, together with the transport lorries of the panzer grenadiers, charge up-hill like a storm.

"While the panzer grenadiers prepare for an enveloping maneuver, which is observed too late by the enemy, and while mounted riflemen are sent forward by their regimental commander in a frontal attack, our heavy tanks roll on up the road, thrust their noses round the rocks of the escarpment and shoot at 600 meters. They shift closer and closer, ignoring the many mines, to which they are nearly invulnerable because of their thick armor, destroy antitank gun after antitank gun, and machine gun after machine gun.

"Nearly at the same second as the destruction of the heaviest weapons of the enemy, the panzer grenadiers appear from the rear of the flanking position and attack at a distance of a throw of a hand grenade, and finally at the point of the bayonet, the enemy, who is defending himself tenaciously."

This is no longer the tank attack of 1939 and 1940, but a very conservative form of attack whose chief modification is that the panzer grenadiers are employed, and even this is only possible in this country, where the spaces are too wide to avoid open flanks. Instead of the initial breakthrough with masses of tanks, there are a few tanks which help the initial attack of the mountain infantry. It might be argued that this change is determined by the country, which prohibits the original form of tank attack, but the Balkans are more mountainous than Tunisia and they were conquered by tank divisions.

German tank tactics have, in fact, deteriorated, partly owing to their lack of tanks and partly to the new tactics of their enemies.

#### Lessons From Experience in Aerial Combat

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article by Major of the Guards K. Alekseyev, Soviet Army, in *Krasnaya Zvezda* 4 August 1943.]

MANY times we fliers are witnesses to, and at times direct participants in, aerial battles in which, let us say, four Yakovlev-1 aircraft successfully engage eight Me-109's. Conditions of such combat are unequal, but, as experience has shown, the relative numerical strength frequently is of no decisive im-

portance. Experience of war furnishes many interesting and instructive examples which show that both in light and heavy aerial battles it is the commander who is an inventive organizer and director of combat, who is filled with initiative, that usually emerges victorious. At the same time combat experience teaches us that even when enjoying numerical superiority and when each individual pilot is highly qualified, it is difficult to depend on achieving success if aerial combat lacks the commander's organization.

There comes to mind an unpleasant episode from our combat experience. A large group of hostile Ju-87 bombers protected by Messerschmitts was proceeding to a certain military objective to unload their bombs. Our fighters caught this group en route and an engagement ensued. It is very tempting to shoot down a Ju-87, and all the pilots of this fighter group, without further thought, came down on the bombers, paying no attention to the group of Messerschmitts flying above. In this our fighters acted without any organization, each plane for itself. They broke up the German combat formation but failed to bring down even a single hostile plane. A few minutes later this same fighter group was compelled to engage the Messerschmitts, and again the group fought without result. Instead of engaging the enemy in organized, group combat, our pilots engaged in individual battles with the German aircraft. What followed was that our group found itself in a difficult situation and was barely able to retire.

Through our own bitter experience we learned what happens when preliminary command instructions are lacking, and thereafter we employed different methods. Once a communication was received at our airdrome that twenty-seven Junkers accompanied by Messerschmitts were flying in our direction. Immediately a formation of four of our fighters took to the air. Observing the instructions of the senior commander who organized the flight, this formation did not proceed to attack the hostile bombers, but, gaining altitude, it flew to meet the enemy fighters and engaged them in combat. Following this, a second group of our planes took off and proceeded to attack the Junkers. This aerial combat ended with a victory by our pilots. They prevented the enemy from reaching the important objective, brought down five enemy planes, and returned to the airdrome without suffering any losses.

To engage successfully in aerial combat on vertical lines with simultaneous echeloning of the planes in height can be accomplished only when the formation of four or eight aircraft is excellently teamed. However, it must be said that the first condition of a high degree of tactical teamwork is the exemplary execution of formation flying. Victory during combat in daylight is unthinkable if there is no mutual understanding, no truly comradely "feeling of support," on the part of the formation leader and those he leads. Although to my own credit there are about twenty

enemy planes, I must say that I succeeded in shooting down some of them thanks only to the excellent support of my flying comrades.

On one occasion, pilot Novokhatko and I had to engage in combat seventeen Ju-87's and thirteen Me-109's. In such a situation, when the enemy's superiority is so great, it is of course difficult to speak about any prior plan of battle. When faced with a situation like this, the leader can be saved only by lightning-like orientation, a bold blow, and the assurance that the other plane, which he leads, is providing him with dependable protection. In engaging the enemy, who was fifteen times stronger than we, Novokhatko and I threw ourselves into their very midst. To start, I attacked frontally the first bomber group, then the second. Novokhatko continued to protect us from the rear.

As I succeeded in shooting down two Junkers we were beset by the hostile fighters. We proceeded to fight on vertical lines. Eight minutes later help arrived for us and the German aircraft were dispersed. In this unequal battle we were aided only by the fact that we flew well together, and that both the leader and the other aircraft led by him understood each other well. Together we represented a compact force capable of attack and defense. This quality would have been irretrievably lost had Novokhatko succumbed to the faulty temptation of doubling our force by attacking independently. Cases like that unfortunately still occur in flying and lead to regrettable results.

Perfection of each pair of fighter aircraft should be one of the first missions of the commander who is striving to improve the combat qualities of his unit. Along with training activities, both on the ground and in the air, an excellent method of raising the quality of combat work of flying personnel is the discussion of former air battles. It should not be a superficial discussion, but marked by severe criticism. It often happens that the formation leader reports on his actions, the commander follows pointing out the fundamental errors, and then the discussion comes to an end. This, of course, is senseless. Every step taken by the fighter pilot should be subjected to a thorough analysis, and the participants in the battle should discuss every detail of the pilot's action in combat with the enemy.

To me, as a fighter pilot, the most precious achievements are victories over German pilots at night. Particularly memorable is the night during which I succeeded in shooting down three Heinkel-III's. At that time the enemy planes were giving no rest to a populated place situated near our field. This place was bombed regularly every night. Our fighter pilots were given the mission to cure the Heinkels of their habit of nocturnal bombing. In this instance we acted in close coordination with our searchlights. The mission was not an easy one. The main thing was to grasp the moment when our searchlights caught an enemy



plane in the intersection of rays and then attack it with our plane gun and machine gun. The success of the attack was determined by seconds. To let the enemy plane slip away from the intersection of the rays and to be yourself caught in it was to lose everything.

I approached the enemy from below, unobserved by enemy gunners. They could discover my presence only by the flashes of my fire. Usually, at this moment the enemy replied with his fire, which, however, struck into open space, for after firing a few rounds I flew off slightly to the side and after a short pause attacked anew, until the enemy was finished. By following this method, the fighters from the "X" unit succeeded in a relatively short time in bringing down fourteen enemy planes at night.

### *The Work of the Rear*

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article by Lieutenant General N. Anisimov, Soviet Army, in *Krasnaya Zvezda* 20 August 1943.]

THE SPHERE of activity of the rear elements involves extremely varied problems: from the tens of cartridges filling the soldier's cartridge case to the numerous railway trains with the most varied combat materials delivered at unloading points; from repair patches for the soldier's shoes to the repair of complex combat equipment; from the bandage the orderly puts on the slightly wounded soldier to the skilful maneuvering of hospitals.

The commander of a unit or a force of combined arms must constantly manage the work of his representative in the rear and the work of the rear as a whole. Practice shows that in some places there is still the tendency to dispose rear units too far from the front line without any reason.

During the attack, when advancing troops move away from unloading points, it is especially essential to use auto transport in a careful, correct manner. Armies, with the aid of their transport, must bring all loads to divisional regulating points, and from here these loads are shifted by divisional transport means to regimental exchange points. But sometimes this system is violated.

It is also provided that in each unit there be centralized direction of the activity of auto transport. The command of auto transport must be concentrated in the hands of the unit commander's representative in the rear. Actually it sometimes happens otherwise. Auto transport is assigned according to services required. As a result, one group of vehicles works on re-loading and cannot ever cope with the abundance of tasks, while at the same time other vehicles stand idle.

Combat experience teaches that movement of all possible types of transport must be accompanied by the strictest measures of camouflage against enemy

aircraft. This is obligatory. Careless movement of transport columns helps the enemy in discovering the intentions of our command. Determining the direction of large movements of freight, enemy air scouts at once draw important conclusions. Here it must be remembered that secrecy of movement of transports is essential not only in the period of preparation for the attack, but also even in the course of fighting, when our troops execute any maneuver. Besides this, camouflage measures help to reduce to a minimum the losses of valuable matériel and transport means by the action of enemy aviation.

Sometimes losses which rear units suffer from air attack are explained only by the fact that the commanders of these units do not rigidly demand camouflage. Here is a characteristic example. In a unit where the commander's representative in the rear was Colonel Gavrilov, losses from action of enemy aviation were small. But in another unit (commander's representative in the rear, Lieutenant Colonel Rybin) they were far graver. However, both units were engaged under completely identical conditions. The whole thing was that the first of these men took care of the camouflage of transports, while the second neglected this matter.

These facts again recall the necessity of strictest camouflage discipline in the rear units. Camouflage must be observed both in movement (maximum use of darkness, maintenance of intervals between vehicles and units) and at even the shortest stops.

Other measures of antiaircraft defense must not be forgotten. Rear units must keep the sharpest watch on the air. But this is not enough. It is well known that sometimes hostile planes attack our rear from low altitudes. For this reason the personnel of all rear units must learn to conduct organized rifle and machine-gun fire on low-flying enemy planes.

One of the most serious questions of the work of the rear is the evacuation of wounded. It is necessary that each wounded man promptly receive medical first aid and then be quickly sent to the army hospital (except those slightly wounded).

It is very important that the chief of medical service of the army have at his disposal in the second position a reserve of field hospitals for the reinforcement of medical battalions. The correct distribution of hospitals, their planned maneuver, the assignment of reserves—all this must be exactly brought about at any tempo at which units may be moving. In many cases, especially in the summer, auto transport can move on country roads and even without roads—along column routes. Hence there arises the obligation to designate routes of evacuation away from the main flow of transport.

Exact work of rear elements largely depends on the condition of auto transport. It is necessary to strive stubbornly to have a mobile pool consisting



of not less than 90 percent of the general quantity of auto vehicles. [This is an exact translation—not understood.]

At times it seems that transport is completely taken up with pressing problems, and it is difficult to assign a part of these vehicles for repair. This, however, is incorrect. A careful manager always finds possibilities for assuring planned, well organized repair of auto transport. Dependable condition of roads and exact traffic regulation service also considerably increase the proper function of communications. It is necessary to strive that our automobile roads always be maintained in complete order.

In conclusion let us dwell on one question of serious importance. It is the question of supplying those units and forces of the combined arms which in the course of battle penetrate deep into the dispositions of the enemy, and whose communications under such conditions are not always reliably assured. At times, these communications are not only under artillery fire but also under rifle and machine-gun fire. Sometimes hostile tommy gunners filter through to the only road on which the flow of supply and evacuation takes place. All this, of course, introduces a certain tension into the work of the rear installations, but in no case must the supply of troops break down.

On one of our fronts in the former battles such a situation arose when a unit, engaged up front, was connected with the rear by a zone having a total width of two to three kilometers. At times the enemy succeeded in narrowing this neck still more. There was even a time when the only road was cut off. How were supplies brought up to the troops in such circumstances?

Various means were tried. Efforts were made to push auto columns through in the daytime. This caused losses and did not give the necessary results, as the enemy smashed the vehicles moving forward and the debris clogged the road. Then the decision was made to do this at night. A column consisting of a considerable quantity of vehicles was organized. It was broken up into small groups, five vehicles in each. The column was protected by tanks and a unit of tommy gunners was assigned to accompany it. The enemy heard the roar of motors and opened strong fire, but could disable only two vehicles. Previously instructed soldiers pushed the smashed vehicles to one side of the road, clearing the route. At the tail-end there were spare vehicles onto which the loads were shifted from the damaged ones.

As a result, a large column made its way to the troops, suffering only minimum losses. Subsequently, all auto columns on this line of communications were accomplished by soldiers with automatic weapons and were protected by tanks. Motors of the vehicles were surrounded by sacks of oats to protect them from rifle and machine-gun fire.

The Red Army also has transport aviation which can supply units breaking through far ahead, dropping freight parachutes with supplies, fuel, and provisions for these troops. During the great Stalingrad battle our transport aviation was of inestimable help to a number of units which it was impossible to supply by other means. Of course, when using aviation, it is necessary to organize with special precision the movement of supplies needed by the troops. The higher headquarters must be promptly informed of the time and the place of dropping supply-bearing parachutes, and the setting off of prearranged signals must be accurately determined.

The experience of the war affirms that there are no objective causes which, considering the wealth of equipment of the Red Army, make impossible the flow of supply even under the most complex conditions. It is possible to do everything under any conditions if the commander of the war installations is persistent, and if the commander of the force of combined arms insists on the proper functioning of the rear and at the same time cares for his rear elements.

### ***Establishing the Bridgehead at Sabsk***

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a German article by Captain Duic, German Army, in *Artilleristische Rundschau*.]

*This article and the one following it from Artilleristische Rundschau February 1943, while separate articles, describe phases of the same action.—THE EDITOR.*

THE FOLLOWING account is based entirely on notes by the author. Our battalion was from the Second Armored Artillery Regiment of a Thuringian armored division.

On 13 July 1941 the armored division, which was moving along the Pleskau-Leningrad road toward the city of Luga in hard battles, was turned from this destination toward the northwest at Sapolje (Figure 1). It was to reach the Luga near Sabsk and form a bridgehead there. The advance proceeded without incident on into the evening through Pljussa, which had been taken the day before by a small detachment of the division advancing along the railway. Our division belonged to the advance guard. The farther the march led away from the Leningrad road, the greater became the terrain difficulties. In places even the maps failed completely.

After three hours of rest we moved on in the gray morning of 14 July. Once we contacted units of the left neighboring division, but this only made us realize even more fully the empty wideness of this wooded, sparsely settled country. At first the roads were mainly sandy. Later, however, came nothing but wet stretches of path. The vehicles of the advance guard battalion ruined the road still more with

their treads. All vehicles of the battalion not absolutely needed had, foresightedly, been attached to the field supply train. More and more often, however, the wheeled vehicles had to be dragged over impassable stretches of road. Behind the advance guard, the march column broke off entirely. The battalion started reconnaissance of better detours for the units of the regiment which were following, especially for the supply train.

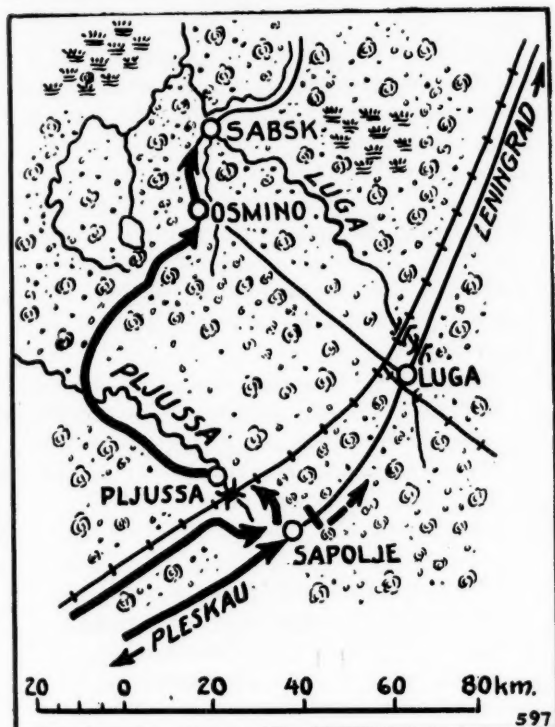


FIGURE 1.

In the early afternoon the advance guard emerged from the wooded region into the open territory south of Osmino without contact with the enemy and unmolested by the Soviet fliers, who dropped their bombs farther in the rear. But here armed natives, obeying the order issued by Stalin a few days earlier, offered resistance for the first time. After rapid occupation of positions, artillery employment by the battalion proved unnecessary, but now the positions, and later the batteries on the march, were repeatedly attacked by fliers.

Again it was a question of a bridge, the Luga bridge at Sabsk (Figure 2). The road to that place led about six kilometers through a dense wood on whose far side the village of Sabsk lay on the Luga, with its larger part on the north bank. The wood offered poor positions to only two batteries close by the road. Even later the situation was not improved without much clearing of trees. Therefore the batteries were brought into position from the march in a deep echelon formation. The surprise planned demanded greatest haste. The point remained under the protection of the woods. Immediate opening of fire by the battalion was to keep the Bolsheviks, who

apparently had not noticed us yet, from blowing up the bridge while the leading company worked up to the bridge. All was still calm. The inhabitants, however, could betray our presence at any moment to the enemy on the other bank. We saw movements over there, scarcely recognizable in the twilight, and suddenly—our company was not yet up to it—the bridge blew up. A little later our shells were on the target—too late. Now came the first shots from the enemy. The continuous, well developed positions recognizable along the north bank were, however, obviously only partly occupied. Hostile tank hunters

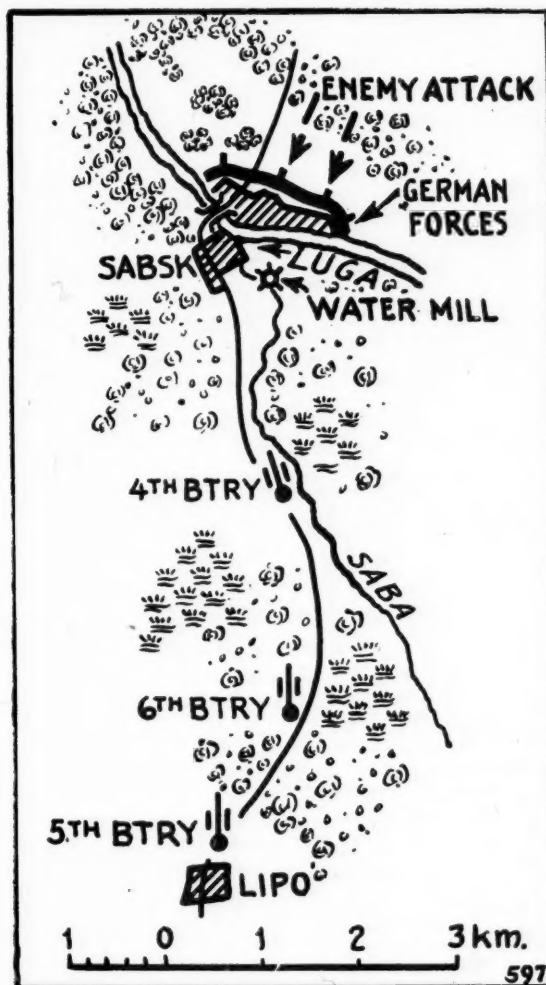


FIGURE 2.

and machine guns hardly found targets in the descending night. The north part of Sabsk was on fire.

The blasting of the bridge did no harm, inasmuch as the Luga River, rather broad here, was easily forded later by all vehicles with the exception of motorcycles (Figure 3). On the night, illuminated by the fire and under strong fire protection of the artillery battalion and heavy infantry guns, crossing was accomplished with bladder rafts; and a bridgehead was formed on the edge of the north part of Sabsk after a brief battle. In consequence of the rapid advance, the Bolsheviks, despite strong,

prepared positions, were not yet completely prepared for defense. Because of radio interference caused by the traffic across the river, only one of the two observers sent across with the riflemen could fire a barrage. The other two batteries had to be satisfied with the observation posts on the south side of the river.

In the night the main part of the advance battalion also crossed the river. Increasing hostile attacks began at dawn on 15 July. Radio difficulties were now, at sunrise, especially great; and the telephone lines, which were very long, were often disturbed by

5th Battery, which up to this time had stood almost six kilometers to the rear at the edge of the wood (Figure 2), was brought into position just a hundred meters in front of the hitherto most advanced 4th Battery. This was the only possible way to employ the battery in this particular terrain. War often forces expedients never taught in peace. Thus communication was now assured to two batteries. If necessary, one observer could work for both batteries.

The place of crossing still lay under strong tank-hunter fire from a dugout down-stream. Fighting it from covered position was unsuccessful. In order to cover these tank hunters by open-sight fire from the higher south bank, a gun was brought forward under the concealment of some wooden buildings but was discovered upon opening fire. It suffered losses without achieving effect, and, since the houses around the place immediately caught on fire from the hostile shells, the gun had to retire without accomplishing its mission.

The surge of battle often resulted in tight situations because of the slight depth of the bridgehead. Nevertheless, we were finally successful in pushing forward in counterattack over the north edge of Sabsk to a small elevation (Figure 3). From this point the hitherto very limited visibility of the artillery observers was extended to the forest edge north of Sabsk. Now all attacks could be repulsed as soon as they emerged from the woods, while hitherto this could be done only after the attackers had crossed the small hill—an example of how very much the artilleryman must strive for the possession of certain points. The losses of the Bolsheviks were so great that they took advantage of a cloudburst at noon to disengage from us.

The bridgehead could now be widened somewhat west of Sabsk. A still greater expansion, whereby the crossing place and the ford would be still more out of the enemy's fire area, was not possible with our limited forces. The bulk of the division was held up by the roads, which had become even more impassable after the rain, and by enemy forces south of Osmino. Whatever worked its way through the mud was urgently needed to keep the march road open. In the evening only a battery of heavy field howitzers and a platoon of 10-centimeter guns arrived, and these were all attached to the battalion. They had to take position far to the rear on the edge of the woods north of Lipo (Figure 2).

Our line now ran most favorably. It used, in part, the dugouts and antitank ditches of the position prepared here by the Bolsheviks with great expenditure of labor. Only in the western part did groups of bushes which hindered the view reach up to our line. Here the next attacks were to be expected. Each battery was assigned two barrage areas. By partial use of two observation posts for each battery, or in certain circumstances by one ob-



FIGURE 3.

fire. The river was too wide to bridge, and hostile fire made a careful pole installation through the water impossible at this time; so the wires resting on the river bottom were probably repeatedly broken by shifting. In these critical moments artillery defense was occasionally uncertain because of such communication difficulties. The Soviets brought excellent troops to attack: for example, a battalion of members of the Leningrad noncommissioned officers' school. The enemy had also brought up artillery over night.

In order to lessen communication difficulties, the



server serving two batteries, the result was that each battery could act against both the eastern and the western part of the bridgehead.

Night and morning of 16 July passed quietly. Only increasing artillery fire and the noise of motors betrayed reinforcement of the enemy. In the early forenoon the platoon of 10-centimeter guns was brought into position at Sabsk (Figure 3) so that it could be employed in our front line for point-blank fire.

Soon thereafter came the first attack by a 52-ton tank. The tank-fighting weapons present at the bridgehead and the two guns on the south bank could not, indeed, destroy the tank, but drove it off. To help in this situation, one gun each of the two advanced batteries (4th and 5th), which in any case greatly lacked room in their positions, were moved rapidly into the western part of the bridgehead. Shortly thereafter two tanks of the same type repeated the attack. They broke in on the eastern part of the bridgehead and tried to roll up our line toward the west. In the fire of both guns, which were quickly turned around, one tank lay burning and the other took flight. The guns were now brought into position among the ruins of the eastern part of the village (Figure 3).

The enemy kept on bringing up reinforcements. Detrucking of motorized troops was observed. In the afternoon the Russians attacked the western part of the bridgehead, and during the night they attacked again, both times unsuccessfully. Hostile fliers made themselves very unpleasantly evident, both fighters and Ratas [type of Russian plane]. By low-level attacks, these fliers made the traffic on the only approach road through the woods especially difficult. Our antiaircraft artillery was still temporarily absent. Losses from enemy fliers and artillery remained relatively low, however, since the sandy soil made it very easy to dig in. This had hitherto never been necessary for the battalion in such a degree; but now the battalion command post, the observations posts, and partly even the firing positions were dug in. The concealment, especially of the firing positions, was so excellently done that during the whole time not a single air attack occurred on the firing positions lying so unfavorably close to the road (Figure 2).

On 17 July antiaircraft artillery finally came up to the front. The rearmost light battery (6th) of the battalion was moved forward almost to the south bank (Figure 3), but it was concealed; the attached heavy battery was moved up to its former position (Figure 2). Meanwhile the approach road had been successfully improved and the enemy attacks on it were repulsed. But the enemy had now attacked our security units at Osmino from Luga, so that a new defensive front had to be formed there. During the day it remained quiet at the bridgehead with the exception of frequent spells of strong artillery fire.

In the late afternoon persistent artillery fire started in strength. The violent fire was especially effective on the relatively small area of the bridgehead, on the ford, and on the approach road. Without a pause the enemy hammered for six hours. Sand crumbled from the walls of dugouts and pits. Through lack of suitable reconnaissance, an effective response was impossible.

The enemy must have had at least two artillery battalions at his disposal. He could easily bring up plenty of ammunition on good roads from nearby Leningrad. With us, on the contrary, ammunition supply encountered difficulties, and general supply was partly accomplished by air.

At midnight came the attack. In the barrage fire of all weapons it collapsed, and the enemy tried no other serious advance for the time being. At the same time, the arrival of advance elements of a relieving battalion was announced. In the early morning of 18 July began the relief, which, although not hindered by the enemy, proceeded only slowly, being undertaken by sections and single guns on account of danger from the air. The wires and ammunition were abandoned and replaced farther back by the relieving detachment. The battalion itself moved into the quieter defensive front at Osmino.

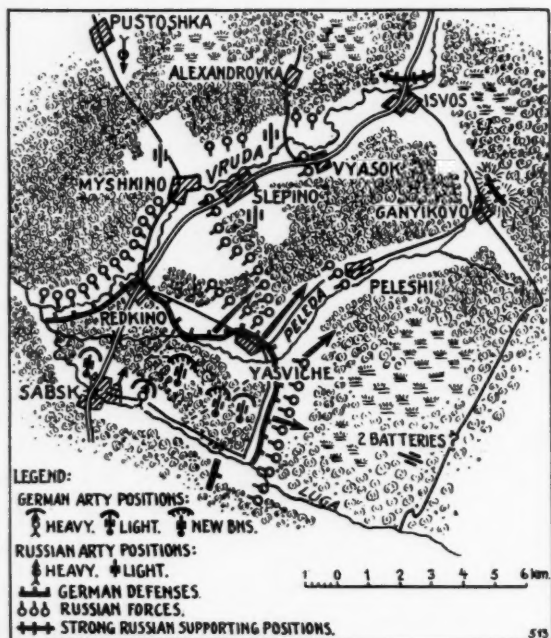
The battles on the Luga took place in a terrain very unfavorable for artillery. There was a lack both of observation posts and of firing positions. The possibilities of observation, limited by the terrain, could not be made good by other means of reconnaissance. Our weak forces provided insufficient infantry protection for the firing positions. Thus in their firing positions two batteries suffered losses from inferior Soviet forces which had crossed the Luga under the protection of the woods. Ammunition supply was hampered by terrain and by the enemy, and therefore extreme economy was necessary. Reinforcement was not to be expected for a long time. Neighbors were twenty kilometers away on the left, eighty on the right (air line). For the enemy the situation was exactly the reverse. Nearby Leningrad furnished troops and ammunition in abundance. This contrast moves our success into true focus; here an important starting point for the subsequent attack on Leningrad was obtained and held, thanks to the firm defensive will of all units, to the special accomplishments of the exhausted soldiers, and not least to the support of the artillery.

### ***Attack from the Bridgehead at Sabsk***

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a German article by Captain Duic, German Army, in *Artilleristische Rundschau* February 1943.]

THE BRIDGEHEAD formed at Sabsk on 14 July 1941 had been expanded so that the enemy could not see

into it, and a part of it, as well as the ford, was protected against the fire of hostile infantry weapons. Against enemy encirclement attempts from the east, a deep defense flank had been formed on both banks of the Luga River. The gap to the left neighbor was defended by the mobile tactics of our reconnaissance.



In the bridgehead itself stood one heavy and two light artillery battalions (see sketch). Two more light artillery battalions stood on the south bank, and had, as their main task, flank protection to the east and northwest.

Artillery fliers and an observation battery supplemented the observation posts on the ground. Air reconnaissance, to be sure, could not penetrate completely, since the Bolsheviks had developed a strong air defense and hostile pursuit fliers often attacked our reconnaissance planes. Besides that, the hostile batteries were excellently concealed and never fired when German fliers were in the air.

The observation battery had a difficult task. The Soviet artillery fired from several directions so that the net of computing stations had to be changed frequently, which always involved a loss of time. Finally, with the use of our own computing stations and with the help of a computing station borrowed from the observation detachment of the neighbor on the left, an expanded net was built up, sufficient for the main directions of reconnaissance. Besides, there existed, as long as the pressure on the right flank was stronger, a second net with direction of reconnaissance east. To save radio apparatus, wire was used in part. With the little equipment of the observation battery, recourse here had to be made to the regimental signals platoon, which finally gave up all its apparatus too.

The observation battery in this part of the cam-

paign produced good results. The hostile batteries were compelled to move continually. A time comparison of the fire activity of the enemy's batteries gave a fairly good survey of their number and caliber. According to it, the Soviet artillery standing at and north of Slepino and Vyasok was at least equal to our artillery at the bridgehead. The group at Pustoshka, mainly heavy batteries, acted alternately on the bridgehead at Sabsk and on the bridgehead of the left neighbor at Poritsye (not shown in sketch). Besides that, a long-range battery standing farther north shelled the rear lines of communications, especially at night.

The grouping of hostile artillery revealed that the enemy expected the German attack along the Sabsk-Slepino road. In this area he had organized himself excellently for defense in the almost four weeks which the bridgehead lasted. Airphoto reconnaissance had indicated strong development of the towns and the borders of the woods lying on the flank north of the road. In addition there were many and strong mine obstacles. On the other hand the development of hostile positions in the brookland of the Peleda running northeast, east of the road, was known to be weaker. There, consequently, the attack for 8 August was set, while a newly installed division west of Sabsk was to advance across the Luga River and through the woods to Pustoshka.

Recently the enemy, when he was still superior in strength, had been forced to remain silent in the main. Our side renounced immediate answering fire, although the riflemen often wished it for psychological reasons. Repulse of hostile attacks and combatting of artillery according to the principle: "The hostile artillery must notice that by its fire it creates only an unpleasant situation for itself," were, besides checking the firing data, really the only reason for our firing. Now, before the attack, the enemy must under no circumstances notice a change in our behavior.

For the attack the two light artillery battalions standing on the south bank had to be moved up to the bridgehead behind the attacking riflemen (see "new battalions" in sketch). The tanks had to make a feint farther west in the direction expected by the enemy. Positions were only partially to be found in the woods region. Mostly they had to be built. On the next-to-the-last and last days before the start of the attack, pioneers felled hundreds of trees for this purpose.

It was the same way with the approach roads. Now, especially in the eastward part, a passable road had to be made (broken line in sketch) which would not run, like the one hitherto used, directly along our forward line. This also was done only on the next-to-the-last day to avoid hostile air reconnaissance.

A net in the bridgehead was surveyed by the survey battery. All battalions associated themselves with this net. Our maps were inaccurate. A captured



map of 1:50,000 scale that we possessed was, to be sure, here in the neighborhood of Leningrad, accurate enough even according to our ideas for a firing map, but its bad condition did not permit reproduction. Hence, a sketch, with coordinates of target points which were taken from the captured map and transferred to the net laid by the survey battery, was distributed to the batteries, so that a list of uniformly calculated correct firing data was available for the artillery battalions.

Greatest emphasis was laid on establishing the artillery support of the attack, not according to maps but in direct discussion with the leaders of the units to be supported. Thus there arose a fire plan which provided first of all a strong fire on the edges of the woods lying in the direction of attack. At the same time with the opening of fire, the infantry was to advance in order to take complete advantage of the surprise effect on the enemy. A bold approach to our own artillery fire was expressly impressed upon them. For this reason the fire had to be so much the more accurate and the plotting of firing data in the terrain was absolutely necessary. Only in the second part of the attack did the fire hit positions, in the woods, which had been discovered by airphotos. After the first fifteen minutes, fire which the observers, advancing with the riflemen, had to control was to replace the fire plan established for emergency. The counter-battery fire was carried out by the heavy battalion and a cannon battery, as well as by units of the artillery of the neighboring division, on the hostile batteries discovered in the last hours before the attack. For the cannon battery an artillery flier was available from the start of the attack. In order to give light batteries, which temporarily were not used for other tasks, the possibility of being able to fight troublesome hostile artillery with some prospect of effect even without observation, they too were furnished with the coordinates of the last-discovered enemy batteries. For adjustment of the fire-plan to the targets, different periods were assigned to the battalions, in which fire was carried out by one battery. The fire orders, recalculated for the other batteries, were tested with single rounds.

The work in the firing positions of the two light battalions, which were to be brought to the north bank, was to be completed before occupation of the positions. Wires were laid, ammunition dumps were set up, surveys undertaken, and shelters built. Ammunition for the attack was moved up in abundance so that each light battery had at its disposal several times its initial ammunition supply stored in small scattered dumps near the positions.

The two new artillery battalions in the bridgehead had to occupy their positions in the noon hours of the day preceding the attack because, according to experience, at this hot time of day the motor noise of prime movers was audible at the least distance.

All other vehicles of the weapons necessary for the continuation of the attack now had to be brought to the bridgehead, because during the attack the ford and the bridge which was to be built during the last night would probably be the target of hostile artillery and hostile fliers. A system of traffic regulation was carefully prepared.

The last day and night prior to the attack held certain dangers because of the accumulation of vehicles and troops in the bridgehead. But all movements were completed punctually. No essentially increased fire activity of the enemy showed that he had recognized our attack intention.

It rained in the night. The infantry had to lie motionless for hours in the starting positions as near the enemy as possible. In spite of these discomforts the attack succeeded on the morning of 8 August. After the first powerful blow the enemy was as if paralyzed, and the infantry broke into his positions. The shell smoke lying like fog in the damp weather favored the infantry advance. In the woods, occasional difficult battles arose in which the artillery could help only a little. On the other hand, the observers advancing to the northeast on the edges of the woods were able several times to eliminate targets on the other side of the brookland for the neighboring battalion. The counter-battery fire was steadily continued. Thanks to this and to the confusion caused by surprise, enemy artillery counteraction remained slight. In the late afternoon the attack could be continued with vehicles. At twilight came the surprising capture of the dominating hill at Ganyikovo, which was in the enemy's especially well-developed rear positions. From there the farthest advanced battalion pushed immediately to the west at right angles to the previous direction of the attack and took the most important part of the supporting position at Isvos which blocked the only road leading north. After short artillery preparation by our battalion, whose observers helped in the attack, this was smoothly done. Thus the whole net of positions along the Vruda fell.

On the next morning (9 August) under security to the north, the Soviet positions along the Isvos-Sabsk road were rolled up from the rear. Another group of the division pressed north from Redkino. In the night, while our artillery continually fired for harassing effect, the Bolsheviks had partly vacated their positions. The rest were taken relatively easily and without special artillery support.

Thus the pre-conditions for a further advance were created. When, then, in the following days, the advance was made along the road through the wooded region toward the north, the success of the first two days bore good results. The Bolsheviks retreating to the woods north of Slepino now fell into our hands with almost their entire artillery equipment.



## *Defense of the Forward Edge*

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article by Colonel I. Khitrov, Soviet Army, in *Krasnaya Zvezda* 6 July 1943.]

HOWEVER deeply defense is organized the struggle for its forward edge largely decides the final result of battle. Defense of forward positions against massed tank and plane attacks involves great difficulties, the more so because in the beginning the attacker has many advantages which may be lost to him later. What are these advantages?

Undertaking an attack, the enemy always concentrates forces which considerably exceed the forces of the defense. And also, as combat is only beginning, the defender will be forced to meet fresh units with only those forces which are available in the given sector. He will not yet have brought up his reserves or supplementary fire elements. In the further course of battle the defense can increase its efforts and even bring to naught the numerical superiority of the enemy.

The second advantage of the attacker is the possibility of starting the action suddenly. If he is able to obtain complete or even partial surprise, the sharpness and strength of attack is incomparably greater in the beginning of the battle. If the first hostile attack is beaten off and the battle on the forward edge is prolonged, the advantage which the attacker obtained by surprise gradually loses its importance. As the fighting develops, whether it moves into the defensive rear or whether the enemy is forced to repeat his attacks with new tactics, the attacker will not again succeed in attaining surprise to the extent possible with the first blow.

The ability of the defense to meet in organized fashion the first blow of the enemy on the forward edge depends largely on whether or not the attacker can begin his actions unexpectedly. In one sector of the front our reconnaissance discovered that the Germans were accumulating large tank forces, but accurate data on the number and areas of concentration of the tanks could not be secured. For this reason the new concentration of the enemy was evaluated in various ways by the staff. Some said that the Germans had concentrated up to 200 tanks; others named a much higher figure. There were also staff officers who did not believe in the ability of the enemy to bring up so many tanks at that place and considered it merely a trick of the enemy to deceive our troops. The Germans, they said, were setting up dummy models and intentionally showing them to our reconnaissance.

However that might be, the fact remained that the Germans were getting ready for something. Meanwhile, reconnaissance data were inexact. It was possible only to guess the intentions of the Germans, and contradictory conclusions resulted.

Then one day at dawn the Germans suddenly

opened strong artillery fire on inhabited points located in the rear of our troops. From this time on, firing was often repeated and soon became systematic. The enemy's artillery fired only incendiary shells and it was clear that they were intentionally setting fire to the inhabited points in our position. Fall was approaching, and perhaps the enemy merely intended to destroy our warm quarters. Hence it was possible to conclude that the Germans did not intend to leave their positions and were not gathering for an attack.

Several more days passed. The Germans became more active, and their activity increased from day to day. Without revealing their basic concentration, they began to undertake attacks with small forces. All the enemy attacks were beaten off, but they were renewed almost every day for a long time, and created the false impression that such minor attacks were to be a consistent policy on the front. This thought became so rooted in the minds of various commanders that even on the day when the Germans threw whole armadas of tanks into attack, one staff commander evaluated the situation on the sector just as before. He regarded the big attack undertaken by the enemy as a continuation of former partial attacks.

In reality the situation was serious. In a number of places the German tanks and infantry succeeded in breaking through our defense. Reaching our rear, part of their mobile forces began to break through in a flank movement to a highway. Soon the fighting spread over the whole sector, not only on the line of the forward edge but also in the immediate rear of our units.

Thus the unanticipated first attack influenced the further development of the whole battle. Having attained some surprise, the Germans did not meet the proper resistance on the line of the forward edge of defense. Wedging into the depth of our position, they thus complicated the battle, splitting the defenders into scattered groups. The defense lost initiative of action, endeavoring only to beat off the enemy attack coming down on it not only from the front but also from the flanks and rear.

Defenders are at once in an unfavorable situation if they do not succeed in anticipating the enemy's sudden attack. They lack their main advantage—the possibility of relying for a long while on obstacles and on the organized fire of all those elements by which the approaches to the forward edge of defense are protected. The unit of combined arms, suddenly attacked, could not hold the enemy on the line of the forward edge. Consequently it did not gain the time necessary for reorganizing personnel and fire elements in depth.

Methods used by the Germans in trying to conceal their tactical or operational intentions are always changing. One thing remains unchanged: the endeavor to attack suddenly in each case. To antici-

pate the unexpected attack, to break up the intent of the enemy in good time—this is what must form the basis of all defense activity. For just this reason the importance of reconnaissance and constant watchfulness is so great. The prolonged disposition of several opposing units in one place and the absence of visible changes in the enemy camp—all this creates a situation which accustoms commanders to routine data on the enemy, lowering their reconnaissance instinct.

Troops are in an especially difficult situation in repelling first attacks, when the enemy has the advantage of surprise not yet annulled by corresponding counter maneuvers. In order not to be placed in such a position, and to meet with the necessary strength the first blow of the enemy, it is necessary to carry on incessant reconnaissance in any situation. Even if a unit stays in the same place several months, and becomes thoroughly familiar with the enemy facing it, nevertheless constant and active reconnaissance is necessary.

Direct contact with the enemy—that is, proximity of trenches—may be used by the attacker for obtaining the element of surprise. True, under these conditions there also operate certain factors complicating the surprise attack. Almost everywhere between the lines stretch wire barricades, minefields, and other obstacles. They hinder the concealed approach of troops and the unexpected attack. On the other hand, under cover of his obstacles and forward trenches the enemy can imperceptibly move up his forces, concentrate them, and maneuver along the front not far from our defense. Finally, attacking from his forward trenches, the attacker avoids the stage of approach. Thus is shortened the time of possible fire action against his combat formations before they reach the forward positions of the defense. In this way, after only a few minutes, the whole weight of battle can be carried into the zone of the forward edge. The defender will be caught by surprise if he learns of the enemy attack only at the very moment it begins. He will not have time to reorganize his forces. Only stubborn fighting on the line of the forward edge, the ability of defense to hold the first pressure of the hostile forces, will help the troops to extricate themselves from this difficult situation.

Every penetration of hostile forces into the rear must be met with immediate and energetic counteractions. Especially, it is necessary to hold firmly the strongpoints on the flanks of the breakthrough. At first, flanking fire from these points cuts off wedged-in groups of enemy tanks or infantry, and then the counterattack contracts the neck of the breakthrough, isolating the wedged-in hostile forces from their reserves and fire elements.

Successful fighting against hostile tanks and infantry who have broken through into our rear is unthinkable unless the defending units can, at the

same time, repel attacks of enemy planes. Every infantryman, machine gunner, and antitank rifleman not occupied in fighting against the ground forces of the enemy must be ready to fire on hostile planes. To deny these planes the possibility of low flight means to spoil their cooperation with ground troops, and hinder the attack.

The defense, relying on prepared obstacles and fire systems, must hold the enemy and beat off his first blow on the line of the forward edge. It is necessary to remember that all the attacks which follow cannot be unexpected, and hence the struggle with them is easier. Reconnaissance, promptly warning the command of the defending side of the incipient hostile attack, helps to break up the suddenness of the attack and largely simplifies the battle with the enemy at its very start.

### ***Photographic Reconnaissance Unit of the British Coastal Command***

[A digest of an article in *The Aeroplane* (Great Britain) 10 September 1943.]

THE SQUADRONS of the Photographic Reconnaissance Unit (PRU), operating under the British Coastal Command, are engaged purely on strategical reconnaissance for the Navy, for Fighter and Bomber Commands of the RAF, and for the Ministry of Economic Warfare. Usually sorties are made for one of five purposes: to gain information of shipping movements or other coastal activities, to reconnoiter enemy airdromes, to map enemy territories, or to assess damage caused by bombing raids.

Present equipment includes special photographic reconnaissance versions of the Supermarine Spitfire and the de Havilland Mosquito. All are fitted with long-range fuel tanks.

Radio equipment is now carried by all reconnaissance Spitfires, although a year ago only one machine was so equipped. Oxygen for about six hours is stored in the cockpit and is used continuously from take-off to touch-down.

The special Spitfires are usually fitted with two F.52 telephoto lens cameras of 36-inch focal length installed behind the pilot's cockpit. Photographs are taken through apertures in the floor of the fuselage and the cameras are accessible through hinged panels on port and starboard sides. The cameras are mounted in tandem and arranged to obtain a 60 percent overlap.

From 30,000 feet a single 36-inch camera photographs an area of one square mile on a frame 10 inches square. The F.52 camera consists of four main parts, a case containing the lens, a body, a gearbox, and a magazine. It is electrically controlled, power being derived from the normal radio batteries of the Spitfire. Magazine capacity is 500 exposures, mechanically fed by a small motor on the side of the gearbox.



On this Spitfire the cameras are controlled from a small box fitted above the instrument panel. After allowances have been made for height and speed the pilot has only to switch on to set the cameras working, and the camera mechanism then continues automatically to expose frames at regular intervals until switched off. Camera freezing has been counteracted by utilizing heat from the exhaust gases of the Spitfire's motor in the same way that the heat from the exhaust gases is used to heat the pilot's cockpit.

For lining up on "targets" in the reconnaissance Mosquito, bomb sights are fitted above an optically flat glass panel. Many more switches and gauges are fitted in the cockpit than in the cockpit of the Mosquito IV because of increased petrol tankage. Three additional tanks are fitted and the external wing tanks can be jettisoned. Power is supplied by two improved Rolls-Royce Merlin motors driving Rotol constant speed airscrews.

Many more cameras are carried than by the Spitfires. All except one are F.52 cameras of 36-inch focal length mounted over flat glass panels which, because of their close proximity to the cameras and because of the great ranges for which the cameras are designed and used, have no distorting effect on photographs. The other camera, usually of 8-inch or 14-inch focal length, is used to take oblique photographs and is mounted at an angle in the side of the fuselage, again behind an optically flat glass panel.

Sorties can, generally speaking, be divided into two categories, high level sorties and "dicing" sorties. The high sorties are the most common and with rare exceptions are the rule on long distance flights. Combining height with speed, the reconnaissance Spitfires and Mosquitoes are able to elude most attempts at interception by the enemy, and the technical quality of their cameras has enabled them to operate at such heights without sacrificing the quality of photographs obtained. Little can be said about the heights, ranges, or speeds of the airplanes, but Spitfires operating in the stratosphere have photographed localities far beyond Berlin, and others have reconnoitered the coast of Norway.

The number of photographs taken of each target varies according to its nature and the weather. Damage assessment sorties usually require the most exposures, and a Spitfire pilot once patrolled Berlin for three-quarters of an hour while he took 500. On another occasion, after the recent sustained attacks on Hamburg, he stopped over the city only while he took something between eighty and a hundred photographs.

When returning from a sortie PRU pilots shoot up their own airdrome to warn the photographic section of their arrival. A motorcycle is despatched to the airplane and intelligence officers can begin preliminary interpretation of the photographs half an hour after the landing. Mosquitoes have one great advantage over the Spitfires in that they have sights

for lining up on their targets before switching on their cameras. A normal bomb sight operated by the observer is used in the Mosquito and areas can be taken in a single run over, whereas the Spitfires, having no sights, rely entirely on the pilot's judgment, and several runs are often necessary before he is certain that nothing has been missed. For oblique shots the Mosquito has sighting marks on the side of the transparent cockpit hood and on the upper surface of the port wing. When the pilot gets a target in line with the two sighting marks he knows that the target will be in the center of a photograph taken with the oblique camera which is controlled by the pilot. The vertical shot cameras are controlled by the observer from small boxes fitted in the nose near the bomb sight.

Sometimes PRU airplanes are required to take photographs of exceptionally small targets which can only be found by flying low over the countryside. Within the Unit this is known as "dicing" and entails a mad dash across the country at tree-top height, quick recognition of the target, a rapid climb to 2,000 feet, exposure of a number of frames while remaining at a most convenient height for enemy ground fire, finishing in a hurried departure and speedy return to England. For these low-level sorties Spitfires are used. Map-reading at ground level is the main difficulty encountered because the speed of the airplane brings landmarks into view one after another at split-second intervals.

Accurate weather forecasting plays a large part in the success of this photographic reconnaissance work. There is always present the risk of sending airplanes long distances only to find meteorological conditions unsuitable for photography, but so far forecasting has been remarkably accurate even at extreme ranges and few sorties have proved abortive because of unforeseen bad weather.

Navigation of the two-seat Mosquitoes on high level sorties is comparatively simple when compared with that of the single-seat Spitfires at similar ranges. In the Mosquito, the observer can give a large part of his undivided attention to navigation by normal RAF methods. In the Spitfire, the pilot has not only to navigate his airplane but to fly at the same time and so cannot employ the usual mathematical calculations. Instead he relies almost entirely on high-level map-reading.

Many difficulties face PRU Spitfires and Mosquitoes when obtaining a damage assessment photograph. If a raid by Bomber Command is successful, clouds of smoke obscure the target for some time; the better the raid, the thicker the smoke. Also weather can deteriorate after a raid and prevent PRU operations. Then when the weather changes again and sorties become practicable, Bomber Command has a habit of stepping in to "stoke" the fires up. Bomber Command can also so alter a target that identification becomes extremely difficult. After the

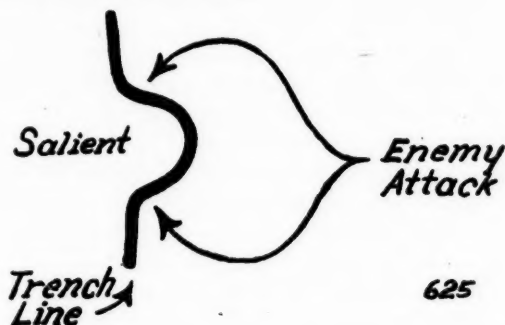


famous dam bursting raid on May 17 the first Spitfire sent over to photograph the breached Möhne Dam was unable to find it. So much water had left the reservoir that its shape had changed completely and the vast sheet of water released by the breaching of the dam obscured many otherwise prominent landmarks.

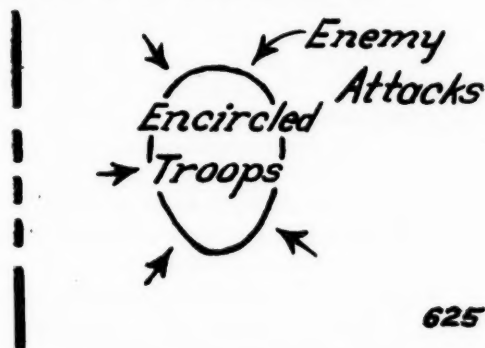
### Look Out, We're Surrounded!

[From an article by Captain C. A. Kelly in *An Cosantóir* (Eire) September 1943.]

IN THE last war if the trench lines bulged towards the enemy a "salient" was created. If the enemy attacked the salient head-on, he, at most, would succeed in flattening out the line again. However if he attacked the flanks like this:



he often succeeded in cutting off the troops in the salient who ended something like this:



The troops in the salient looked on this type of tactics with distaste—those who survived usually ended up in a prison camp. When a unit was cut off like this they were generally regarded as a write-off. But what happens today? Look at the war on the eastern front. Both sides there are constantly carrying out encircling tactics—sometimes on a large scale, when whole armies are cut off, and at other times on a platoon or even a section scale. In every case, however, even when the units are encircled, the fight is far from over. In the majority of cases the units which were being encircled fought their way out by clever tactics and then carried on with the war. The success of these tactics was due to the fact that officers and men were ready for such an

event as encirclement. I'll repeat that—they were ready for it.

Similarly, the British Expeditionary Force in France appeared to be in a poor way in May 1940, with the sea at their backs and surrounded by Germans on every other side; but they got out of a situation which even the British Prime Minister obviously regarded as nearly hopeless.

Well, why the difference between this war and the last war? The difference lies in the fact that war nowadays is mobile, and to a mobile and well-trained unit the threat of encirclement does not hold the dangers it had for the cumbersome, slow moving troops of 1914-18.

Although we should realize that encirclement is almost certain, at the same time do not get the idea that we should accept it passively. Far from it! We must fight vigorously to protect our flanks and rear and keep our supply routes open. To help us in this we have the "blocked areas." These cannot prevent us being encircled, but they can give us what is next in importance—adequate warning of such attempts, and they should impose considerable delay on an enemy engaged in such an action. Similarly, our organization of defensive positions should make encirclement difficult. Each platoon should be sited for all-round defense and should be able to support the adjoining platoons if the enemy attempts to cut them off. In this way the defense is as difficult to break as a bundle of sticks—a number of separate sticks can be broken but when they are tied together they are almost unbreakable.

At this stage I would like to sort out what you could call the "principles" of what to do if you are encircled. As with many principles, it may sometimes be necessary to violate one or all of them, but to do so without sound reasons exposes you to great danger.

Here are the principles of action in encirclement as I see them:

1. Avoid encirclement if possible (I suppose this is obvious, but I want to make myself clear).

2. It is better to have your force concentrated and encircled rather than have it spread out over a wide front with the probability of defeat in detail.

3. If you are encircled:

- a. If you have a definite mission of holding some place or doing some particular job, stay where you are, live on the country, and keep on fighting. Remember, you are not forgotten no matter how bad things look. Some other unit is probably on its way to relieve you.

- b. If you only have a general mission of destroying the enemy forces and if you have the approval of your superior commander (you may have to use your initiative here) break out of the encirclement and re-join your nearest friendly troops.

Here are the principles for breaking out of encirclement:

1. Keep your force concentrated and under control.
2. Hold out a reserve.
3. Find a weak spot in the enemy ring.
4. Contact the nearest friendly troops and arrange for them to help you.
5. Engage the enemy at various points and deceive him as to your intentions.
6. Punch a hole through the weak spot with the main body of your force, using as many of your supporting weapons as possible.
7. Push through the gap, watching your flanks and rear.
8. Do not pull out the rearguard so soon that the enemy will catch up and engage and delay the main body. Don't leave the rearguard behind so long that they are cut off.

### **Point-Blank Fire in Forests**

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article by Colonel B. Aleksandrov, Soviet Army, in *Krasnaya Zvezda* 25 May 1943.]

EXPERIENCE shows that the basis of the conduct of battle in woods, is embodied in the tactics of maneuvering small units, as well as in initiative and independence of action. In order that the gap between separate units and main forces may not adversely affect general success, it is essential to have accompanying artillery within the composition of rifle companies and battalions. The presence of guns in combat formations of infantry makes it stronger, able decisively to surround and destroy firing points of the enemy.

Numerous examples show what a powerful weapon small-caliber artillery is in skilled hands. On the effectiveness of its fire largely depends the success of the infantry attack. But among some commands there is a tendency to tackle all the fire problems even in wooded regions, with guns of heavier calibers. These commanders do not consider the character of the terrain in which the battle is developing and the tactical and technical capabilities of the various types of artillery.

Battles south of Lake Ladoga at the time of lifting the siege of Leningrad provide instructive examples of how to organize artillery fire in preparation against the forward edge of hostile defense. There, even in wooded sectors of the front, as a result of careful artillery preparation, the enemy fire system was crushed and in places completely destroyed, which involved breakdown of command and demoralization of garrisons of hostile strongpoints. With such support the infantry was able to capture the forward edge of hostile defense after the first attack. Close examination of the sector seized by us showed that more than half of the destroyed firing points were to be credited to guns aiming point-blank.

How was fire from open positions organized?

The guns were rolled out into position only on the night before the attack, but prior to that, reconnaissance of the terrain and targets was carried out, routes of approach prepared, and pits and shelters for guns and crews constructed. Every gun commander studied his targets, measured the distance to them accurately, and prepared data for firing.

Engineer activity was carried on exclusively at night. The commander of a gun platoon usually went out on reconnaissance with the commander of the gun and the gunner. Firing was carried on at distances of 300 to 800 meters under cover of artillery and mortar fire of the main artillery elements. The first rounds of the light guns helped to disrupt the fire system of the enemy and facilitated the work of our assault groups and the advance of the infantry.

In woods, the smoke of shell bursts lingers much longer than in open terrain. For this reason, as practice has shown, the first rounds of the mass of artillery should be fired not against the forward edge of defense but should be so calculated as to give the point-blank guns a chance to carry out observed and aimed fire. Before the start of the attack in forest fighting, the guns firing point-blank are more effective if placed in front of the combat formations of the attacking infantry, and after the breakthrough of the forward edge of hostile defense, in the middle of the infantry combat formations.

With such a disposition of fire elements the commander of the unit in the development of battle is able to maneuver the fire of his guns, promptly cover with them the actions of infantry platoons and companies, and fire in any direction. When, for example, after our breakthrough of the forward edge of defense the enemy attempted to cut off the leading company of a certain battalion, the enemy firing points involved in this action were covered by guns following the second company. The company successfully attacked and the battalion was able to move into the rear of the hostile defense.

In actions in woods, infantry must keep the guns close to itself. Then the aid rendered by these guns is prompt and most effective. This may be seen in the following example.

Breaking through the forward edge of the enemy defense, the battalion of Major Koryagin came upon the second defense line and was fired on by two heavy machine guns and a 37-mm gun as well as by automatic rifles from well-hidden trenches in underbrush. His unit suffered great losses and was forced to take cover. In a few minutes two guns of the regimental battery moved forward and silenced the two German machine guns and the 37-mm gun by point-blank fire. The infantrymen themselves annihilated the other targets. Thanks to the skilful use of the fire of the accompanying guns the battalion succeeded in solving the combat problem.

During combat in the rear installations of the

German defense, the enemy at once tries to counter-attack those units which still have not succeeded in consolidating the positions they have attained. Massed fire of infantry weapons and accurate point-blank fire of guns do not permit the enemy to reestablish a lost position.

The unit of Senior Lieutenant Kozmin was exposed to an especially strong counterattack. At this moment point-blank guns accompanying the battalion helped to annihilate the enemy artillery covering the counterattack, and our mortars covered the places of concentration of hostile infantry with their massed fire. The enemy counterattack was beaten off with great losses to him. The Germans left more than a hundred corpses on the battlefield.

Not less important are point-blank guns in the repulse of counterattacks in woods when tanks are involved. In woods, German tanks are less maneuverable; they cannot overcome large trees, and they often stall in the dense forest. Artillerymen must profit by this circumstance, for tanks, having lost their mobility, are easy to destroy.

### **Men of the Air Reconnaissance**

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a German article by Siegfried Hutter in *Die Grüne Post*, Berlin, Germany, 22 August 1943.]

THE RECONNAISSANCE flier? Who knows anything about him? Who can tell something of his battles, his periods of distress and danger? Many times perhaps a sentence or remark touches lightly on the fact of his existence. We read: "After previous air reconnaissance our troops succeeded. . . ." Victory after victory is recorded on the part of fighter planes and bombers, but the reconnaissance flier sinks into the shadows of oblivion. Silently, with apparently no hand in the great victories, he nevertheless lays the foundation for his comrades of the other arms of the service.

"Where is the enemy? What are his intentions?" These are the questions that the command wants answered, and it is the job of the reconnaissance flier to obtain the answers.

#### **Operational Reconnaissance**

For this purpose the distant-reconnaissance units with their long-range planes are used. Far into the areas behind the enemy's lines these flights continue, lasting many hours. New industrial establishments are photographed, traffic arteries are viewed, or the anchoring places of the enemy's fleet are observed. Generally the flights are carried out in the icy temperature of very great altitudes. This offers the only protection to the lonely target against the waiting antiaircraft cannon or prowling enemy pursuit planes. There is no companion on these solitary flights. If the plane does not return, dark mystery

enshrouds its disappearance. The successful flight brings back a case of exposed films. Nothing more. But those films may contain the vital nerves of the enemy.

#### **Tactical Air Reconnaissance**

Tactical air reconnaissance lays the foundation for the various commands of the army. Smaller planes are used for this purpose. They fly over the front at a medium altitude. The observer checks up on the highways and railway lines in the operational area of the army. His mission is to note movements of troops, to provide a pictorial basis for tank attacks, to bring back information for the engineers with regard to the nature of streams and bridges. He turns his information over directly to the army commands.

The hostile pursuit plane is his most deadly enemy. It is the duty of the reconnaissance flier to bring the results of his flight back home; he must escape, for he is not equipped to fight it out. By means of skilful maneuvering or by taking advantage of the protection of the clouds he heads for home. He attempts to approach as stealthily as possible. He employs the tactics of the Indian, up there in the broad ocean of the air. He spies on the enemy, and is continually on his guard and ready for a possible surprise attack.

#### **Combat Reconnaissance**

This takes place on the field of battle itself. Its area is limited and reaches only from the front line to the hostile artillery positions. It is the most varied of all the tasks of the reconnaissance flier and carries the most surprises. The flier covers the combat area at heights varying between almost ground level and 2,000 meters. Where is the enemy artillery hidden? Where are enemy tanks approaching? In what sector is the strong part of the enemy's defense position? What line have our forces reached? These give an idea of the questions that he has to answer. He is connected by radio with the ground commands down below, and if his signals do not get through, he communicates his information by means of flares, smoke signals, and dropped messages. His work is carried out at a fast pace. At times he roars on ahead of his own tanks and shows them the way through obstructions, barricades, and the positions of antitank cannon. At other times he warns his own grenadiers of enemy concentrations and assemblies for attack. The enemy uses all his fire power in an effort to bring down the troublesome spy above his head, and again the most dangerous enemy of the reconnaissance flier, the enemy pursuit plane, lies in wait for him.

#### **The Flying Artillery Observer**

This is a special branch of combat reconnaissance. In this case, the observer constitutes the far-seeing eye of the gunner. He reports a target, whether it be a recognized firing position, an assembly position for attack, or enemy tanks. The artillerymen make



the calculations. After a few minutes' time, the guns are ready to fire. The flier permits the firing of cannon. At other times he warns his own grenadiers round after round at the target, corrects the pointing of the gun, and guides the fire with deadly accuracy at the enemy. The flying artillery observer sometimes circles for hours high above the enemy, like a bird of prey seeking his victim.

In lonely silence, the planes fly out over the enemy; in lonely silence they return. There is true greatness in their solitude. The men down below understand it. Those are "their" planes up there, "their" reconnaissance fliers. Plain and unassuming is their thanks, but it comes from the depths of their hearts. It is worth more than victory. It is the reward of the reconnaissance flier.

### **Artillery Accompaniment of Mobile Elements**

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article by Colonel P. Afanasyev, Soviet Army, in *Krasnaya Zvezda* 29 July 1943.]

THE FUNDAMENTAL mission of mobile elements is to develop the breakthrough of hostile defense in the direction of the main effort of the army. Entrance of these elements into the breakthrough usually begins after the units of combined arms successfully overcome the main line of hostile resistance: i.e., when friendly infantry reaches the sector of enemy artillery positions. Mobile elements may also be committed after the capture of the second defensive line. These are the fundamental principles which decide the missions and composition of the artillery engaged in support of mobile elements which usually consist of large armored units. [Russian terminology employed would indicate that under "large armored units" are meant tank divisions, and even larger units.]

The principal mission of artillery is the swift and decisive defeat of the hostile antitank defense system (and generally of the enemy artillery) in front and on the flanks of the breakthrough. Organic artillery of large armored units naturally forms the nucleus of the elements engaged in the support of armored forces. However, instances are possible when organic artillery will be reinforced by artillery drawn from the GHQ reserves.

How, then, should the artillery accompanying large armored units proceed during an offensive operation? First of all it must be noted that the mobility of armored forces places a heavy demand on the maneuverability of artillery fire and on the artillery's ability to move. Should the artillery fail to open fire on time against the hostile antitank elements or counterattacking enemy tanks, it will thus fail in the execution of its task.

Hence the deduction: for the accompaniment of tanks it is best to designate mechanically drawn, medium caliber artillery, with appropriate transport for ammunition. In those instances when, according to reconnaissance data, the large tank unit will encounter organized hostile defense in depth, then howitzer artillery must also be designated for this purpose. The latter will be better able to handle the enemy's nests of fire in his well organized defensive system.

In the general plan of the mobile unit of all arms considerable attention must be given to the utilization of artillery and to its preparation for combat. In preparing for this task superficial directives and estimates must be excluded. Everything must be based on concretely established factors, taking into consideration the tactical and technical capabilities of matériel of all calibers, the missions assigned to the mobile unit of all arms, the time element, and terrain conditions where the operations will take place. It is important that the plan should include, even in a brief form, the actual problems to be solved by the artillery. In planning the use of artillery during an operation, the artillery staff of a field army must clearly present the missions of the mobile group during the various stages of the action and, according to these missions, also describe the combat activity of the artillery before and after its entrance into the breakthrough.

Commanders of artillery units engaged in the support of a mobile unit after the penetration into the depth of the hostile defense, should be fully informed on the missions of the tank units, the principal direction of their action, and the ultimate objective of the entire operation. In addition to this general information, the headquarters of the mobile force furnishes to artillery commanders data as to routes of march and places of probable encounter with the counter-attacking enemy as well as information on the hostile centers of resistance in the enemy rear. The artillery commander will make his combat plans on the basis of these data. From the army artillery headquarters the commanders of accompanying artillery units receive, as a rule, plans of fire of artillery of distant action [long range?] groups, while from the artillery headquarters of the unit of the combined arms in whose particular sector the entrance into the breakthrough is contemplated, they also receive information on the disposition of this unit of the combined arms during combat.

Without all this information the artillery commanders will be unable to execute their missions with complete effectiveness. The artillery providing support for the armored units engaged within the depth of the enemy defense will be able to count on success only when the artillery unit commander will have a complete understanding of all the conditions in which he will be engaged. Let us illustrate this by an example of the actions of one of our large tank

units sent into the breakthrough in the enemy lines in the Orel sector. The example shows how important to the success of a mobile force is the activity of accompanying artillery planned and completed in all the details.

The mobile force mentioned here was engaged in the direction of the main effort. Towards the end of the first day it was engaged in the breach made in the enemy's defense by our infantry and artillery, and by tanks engaged in the direct support of the infantry. One of the artillery regiments designated for the mission of accompaniment was proceeding with the leading echelons of the mobile group. The regimental commander maintained uninterrupted liaison with the artillery engaged in the direct support of mobile elements sent into the breakthrough, as well as with the commander of the artillery group of distant action.

As the second line of hostile defense was reached the fire blocked the way for our tanks and these vehicles were forced to stop. However, due to the fact that the liaison with the long range artillery battalions was secure, their fire was immediately called for. As a result of the massed blow against the enemy's firing positions the activity of his artillery was considerably reduced and our tanks were able to proceed without suffering any losses.

It should be noted here that until the time when the mobile force reached the areas behind the full extent of the hostile defense, the forward observers of the artillery of distant action proceeded along with the tanks. These forward observers were selected from among the best battery commanders, and they rode in a special tank. Experience shows that the place of this tank is on one of the flanks of the mobile force.

After a short while the advanced elements of the mobile force were counterattacked in the flank by twenty enemy tanks supported by the artillery fire from a strongpoint located on the opposite flank. It was clear that the enemy tanks must be dealt with first. For this purpose our right flank tank unit, together with one battery of accompanying artillery, hit the German vehicles, destroying some of them and forcing the remaining ones to turn back. However, there still remained the hostile strongpoint which stood in the way of our mobile force. Therefore the decision was made to liquidate this enemy strongpoint.

In this task strong antitank defense was encountered. There were thirty guns of various calibers and a large number of antitank rifles in the enemy strongpoint. The maneuverability of the artillery aided it in speedily taking up a combat formation and forming a semicircle about the German strongpoint. While our tanks were firing, both from the move and from short stops, on the German nests they encountered en route, the artillery batteries were engaged in destroying the German antitank guns on the flanks.

The enemy was unable to defeat our tanks and his strongpoint fell.

Thus failed both the German counterattack and the effort to stop the advance of our tanks by means of artillery fire from the strongpoint. Our troops were prepared for this contingency. The artillery combat plan made provisions for both types of enemy activity. In the first instance (counterattack) the accompanying artillery was to deploy and fire at the hostile tanks over open sights, at the same time destroying the enemy firing points, thus assuring freedom of maneuver for our mobile force. In the second instance (enemy strongpoint) the artillery was to fire on the enemy antitank elements preventing our tanks from liquidating the hostile strongpoint. The plan fully justified itself in practice.

Only one thing can be added to the conclusions based on the experience of these battles: If the enemy strongpoint is well fortified, howitzer artillery should be brought in for its liquidation. These howitzers are detailed from the artillery elements earlier designated for the breakthrough of the main line of enemy resistance. In this case the forward progress of the tanks is either delayed until the strongpoint is liquidated, or the strongpoint is by-passed. The latter contingency may be anticipated on the basis of well organized reconnaissance in depth.

### *The Flying Fortresses*

[Digested from *The London Illustrated News* 21 August 1943.]

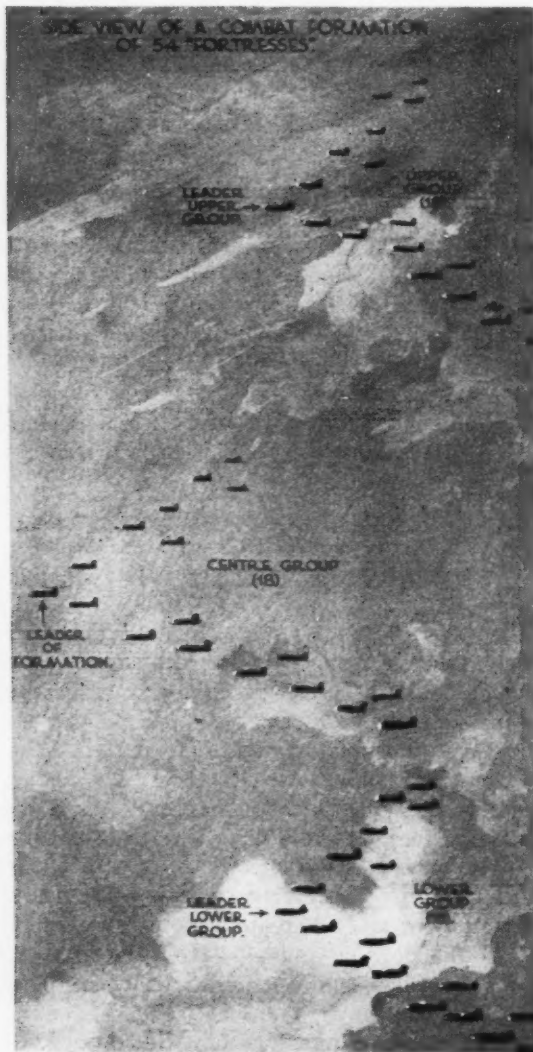
ELEMENTS of the American Flying Fortresses' brilliant success include excellent defensive armor, twelve half-inch machine guns, and a system of very effective groupings (of which the one illustrated is typical), the pilots being taught to fly in tight formation even when taking evasive action. The distance separating these big bombers is often not more than twenty-five feet between wing-tips and fifty feet ahead and astern. The formations are carefully arranged to avoid one fortress masking the field of fire of another, and to create a close bombing pattern. At the word of command from the leader the aircraft drop their bombs simultaneously, the bomb-sight apparatus having automatically worked out the angle of fall, correction for wind, speed, etc. Three Fortresses flying together form an "element," two elements a "flight," three flights a "group," and three groups a "wing." When a bombing force leaves an airdrome, one reserve Fortress takes off for each element, ready to slip into formation if one of the aircraft proves defective. Otherwise, the reserves return to their base.

The height at which Fortresses bomb varies according to circumstances, but is normally between 20,000 and 30,000 feet. The heavy half-inch Brownings carried by these bombers have a firing energy of 327 muzzle horsepower, are effective up to an ex-



treme range of 1200 yards, and shoot at the rate of 800 rounds per minute. With twelve of these machine guns and eight gunners available in each aircraft, and with practically no blind spots, it takes a very stout-hearted enemy fighter pilot to close in on a formation of anything from 18 to 200 Fortresses flying in tightly knit groups. Mostly the fighters' only hope is to fall on a lame duck which has been forced out of formation.

In general, the German pilots now attack the Fortresses from ahead, the most popular maneuver



being to get into position well above the bomber formation to port and starboard, and then to come swooping down and around, sometimes singly, sometimes in two's, and occasionally spaced three abreast. They usually open fire at a range of between 500 yards and 150 yards, depending on the courage of the German pilot. By this time they are well within the numerous arcs of fire from the combined guns of the Fortresses, so after delivering a short burst as they come in to attack at 400 miles per hour—the bombers and fighters are then approaching one another at something like 700 miles per hour—they

turn straight over on their backs and dive below and away from the formation so as to present their armored undersides to the downward firing guns of their opponents.

The average bomb-load of the Flying Fortress is between 4,000 and 5,000 pounds, which, multiplied by the number of bombers flying in formation, is enough to destroy everything within the pattern of the falling bombs. To put it more exactly, the bombs of one hundred United States "heavies," falling in formation, will destroy everything within an area equal to a circle 1,000 feet in diameter—approximately eighteen acres.

### ***Fighting for Cities in Offensive and Defensive Action***

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article in *Krasnaya Zvezda* 20 May 1943.]

EXPERIENCE of the present war has shown that fighting for cities plays the decisive role in the realization of any operation, offensive as well as defensive. Cities and large railroad junctions are those economic and tactical centers on which reposes present-day defense.

In offensive action the capture of cities represents the key for the development of success and the basis for its consolidation. At the same time, in defensive action the firm and skilful defense of every city, small or large, leads to the failure of the enemy, permits to bleed him in the long run, and thus to clear the way for a powerful counter-blow leading to his complete defeat. An example of this is the great battle for Stalingrad. Stalingrad not only survived the monstrous blows of German aviation, tanks, artillery, and infantry, but it also exhausted the enemy in the highest degree and ground up his personnel and matériel in protracted battles, thus creating the prerequisites for the decisive counter-offensive. It is precisely this that constitutes the essential nature of modern defense in general, and the defense of cities and railroad junctions in particular. Every city can and must be a rock which will break the surges of any enemy attack.

War teaches that defense of cities starts not on their outskirts but on their distant approaches: that is, in those positions which protect the city and constitute organic parts of its extensive defensive system. Usually regions immediately adjacent to the city aid its defense. On the city's distant and close approaches are hills, woods, streams and rivers with bridges and fords. In the majority of our theaters of operations large and small villages are directly joined to the cities. These villages after a fashion block the ways to the city and frequently surround it in several rows. These natural conditions should be carefully considered during the organization of offensive combat and fully utilized in the defense of



the cities. It is necessary to locate those places skillfully in the terrain—those villages, large and small, which are key positions for the defense. It is in places such as these that the strongest centers of resistance should be organized in the outer belts of the defensive system. Special attention should be paid to the roads. Troops engaged in combat must absolutely get astride these roads, without abandoning lines of communications in places which are either at junctions between units or in the intervals between them.

Regardless of the strength of the positions protecting the city, it is also necessary to organize conditions for protracted firm defense inside the city itself. It may occur that the enemy will succeed in getting through to the outskirts. Then the enemy must be met by fire from every house on the city's outskirts, and this should be accomplished from convenient, previously prepared positions. Even if the city has been destroyed during earlier battles or as the results of air raids, it nevertheless represents a point which is convenient for a rigid defense. The experience of Stalingrad states that for firm, disciplined units a pile of bricks, a wall of a demolished building, a basement, or a ditch represent a concealed position which aids in the execution of combat tasks.

The principle of all-around defense is even more immutable for the city than for the open field. Units engaged in the city's defense are obliged to perform their duty to the end, and, even when encircled, hold on as long as one man remains alive. When all-around defense is skilfully organized, and when the care for the supply of cartridges, shells, and food is timely, many objects in the city become impregnable citadels, even when the enemy's superiority is tenfold.

The attacker not infrequently seeks the possibilities for by-passing the centers of resistance in the cities. He strives to reach the lines of communications, using his mechanized elements for this purpose. The problem of the defense, therefore, consists in forestalling the hostile maneuver. This is possible only when the actions of the units engaged in the defense of the cities are well coordinated with the actions of the units and forces of the combined arms engaged in the intervals between these cities. It is understood that the effectiveness of any maneuver of the troops engaged in the field is possible only when the units engaged in the defense of the city perform their duty with stubbornness and abnegation, preventing the enemy from capturing not only the city but the road junctions as well.

The distinctive feature of every one of our offensive operations for the capture of a city should be the suddenness of the blow. At the same time a high combat preparedness is the first demand on those of our troops which are called upon to defend a city. If the city's garrison does not permit itself to be caught by surprise, the effect of the suddenness of

the enemy blow will be reduced to a minimum. Combat practice undeniably testifies to the fact that even a small garrison can fully hold up the pressure by the enemy's advance forces until our reserves are brought up or until a corresponding regrouping may be executed. The only things needed are a sober foresight and the necessary vigilance.

High tempo of action in modern war and the presence of many mobile elements with the troops, to a certain extent cancel the gap between the front line and the rear. Therefore it is necessary to take advance fundamental defensive measures in all the populated points located within reach of the enemy's mechanized forces. All the reserve, training, and other units, and also the various military installations and the civilian population, must be prepared to take up the defense of the place speedily at any time of day or night and thus help those of our forces which are engaged in the defense of the rear fortified zone in repelling the enemy blow, preventing him from breaking into the city. A wise folk proverb says that "God helps those who help themselves." High combat preparedness and unremitting vigilance—this is the golden rule of victory which is equally obligatory in the rear as at the front. The war requires that every city and every railroad junction should be strongly organized for antitank defense and prepared for enemy air raids, or for the combined blows of enemy forces of various types.

### *Snipers in Offensive Combat*

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article by Major D. Pavlov, Soviet Army, in *Voennoe Obuchenie*, Moscow, 26 August 1943.]

IN DEFENSE, snipers usually operate on well-studied terrain from a previously prepared position. It is different in offensive combat. Here they must move with the infantry, quickly orient themselves in unfamiliar terrain, and often change firing position. Each shot by a sniper taking part in offensive combat must help the advance of the infantrymen.

The success of Sergei Bezberdev is widely known. When three hostile machine guns barred the way of attacking infantrymen and forced them to take cover, sniper Bezberdev moved forward and opened fire on the hostile firing points. Soon the machine guns stopped firing. Taking advantage of this, the soldiers moved to attack and took a powerfully fortified line. Here, at the hostile machine guns, our men found ten Hitlerites wounded by the accurate bullets of the sniper.

When the Germans went over to counterattack, Bezberdev fired at top speed. Taking position on the flank of his unit, he picked off, one by one, hostile tommy gunners who were sitting atop the armor of their tanks.

In offensive combat the sniper is a redoubtable

force. Destroying crews of hostile machine guns and artillery, snipers, observers, and officers, he helps the infantry unit move forward. At the beginning of the battle the sniper's place is with the combat formations of the infantry on the line of departure or up front. In the latter case, a few hours before the attack the sniper moves up to the forward edge with the sappers who make passages through obstacles, and he conceals himself in previously selected positions, as close as possible to the enemy. Having accomplished their task, the sappers depart but the sniper stays.

As soon as our artillery transfers its fire to the depth of the hostile defense and the infantry moves out from the line of departure, a busy time begins for the sniper. Taking advantage of the fact that the attention of the enemy is concentrated on the attackers, the sniper crushes the now active enemy firing points. In the noise of ceaseless bombardment, the single report of the sharpshooter is lost. For this reason it is hard for the enemy to discover him.

Having moved forward at the start of the battle, the sniper has a number of advantages. He sees the enemy well. Therefore, if our infantry moves forward, the sniper can remain on the spot for some time, firing in the intervals between the combat formations of the infantry and trying to destroy the crews of hostile weapons which are firing on the attacking units.

The snipers must by observation determine promptly the disposition of enemy machine guns so as to be able to kill the crews during the attack. An insignificant knoll, a bush, a tuft of grass, a poorly masked route of communication, all these can serve as indication of the presence of a concealed machine gun. Finally, just before opening fire the crew of the hostile concealed machine gun may disclose itself by movement of the camouflage behind which it is located, by opening embrasures, etc. No less important is prompt discovery and destruction of crews of flanking machine guns. In the period of attack, the crews of the enemy's concealed and flanking machine guns, and likewise his reviving and newly discovered firing points, are the main targets of the snipers.

An important target for sharpshooters in the attack is the embrasure of any hostile fortification. If the riflemen perceives an embrasure in the position of the enemy engaged in defensive action, he must at once open fire on it. Thus it is possible to strike a machine gunner, an artillery observer, or an officer. Finally, by firing on the embrasure, the sniper deprives the enemy of the possibility of observing and conducting fire.

By killing crews of the enemy's weapons, his observers, runners, and officers, our snipers reduce the power of hostile fire and destroy its command. Let us suppose that from the command post of the commander of a German battalion a runner was sent

with the request for reinforcement. Our sniper kills this runner. This means the German battalion will not receive prompt aid. Or let us take another example. The artillery observer of the enemy is correcting fire from an advanced observation post. Our sniper picks off the observer. Thereafter the fire of the German artillery naturally becomes less accurate and our troops can move forward more quickly and with fewer losses. From these two examples it is evident what great importance attaches to the fire of snipers in the attack.

In defense the Germans usually dig deep into the ground and use special apparatus for observation. Accurate fire on these devices—periscopes, range-finders, and stereoscopes—deprives the enemy of the opportunity to observe, and hence to conduct aimed fire. Our troops quickly take advantage of this.

During fighting for the forward edge, snipers can be assigned for action within the composition of assault groups for the destruction of hostile fortified dugouts and emplacements. In this case, the snipers have the task of blinding the garrison of the positions by firing on the embrasures and observation equipment, of killing the crews of neighboring fire elements which are firing on the troops directly engaged against these fortifications, and, finally, of destroying the personnel retreating from the hostile fortified firing point.

To fulfil such tasks the snipers move to specially equipped positions. These positions are usually occupied at night. Fire is opened only on signal of the commander of the assault group immediately before the start of the attack. If the Germans discover a sniper, he must at once move to a reserve position.

At the moment of breakthrough of the first line of enemy defense, and when the battle is moving into depth, it is to the best advantage of the snipers to be located a little behind the attacking riflemen, or on the flank. Snipers are frequently equipped with special protective metal shields. Covered by this shield, the sniper can calmly observe the field of battle, pick out and destroy important targets, or indicate with tracer bullets targets for tanks and artillery.

As soon as the attacking units break through the forward edge of hostile defense, snipers independently proceed to a new position and continue to destroy important targets in that zone which is indicated to them by the commander. A large number of sharpshooters must be located not far from that officer. This is his fire reserve. The officer assigns tasks to the sniper by direct vocal order or by runner.

This is precisely how Senior Lieutenant Vinzhevsky, a company commander acts in offensive combat. Not long ago his unit was hindered in its advance by a well-camouflaged German firing point. Vinzhevsky indicated to sniper Sergeant Alferov approximately where it was located, and ordered him to kill the machine-gun crew. The German machine gunner retired



into the ruins of a dugout. The flashes of discharge betrayed the Hitlerites. Alferov killed the machine gunner, and the company was able to advance. In this fight Alferov, on the order of the commander, destroyed another firing point of the enemy. But even when there were no orders, Alferov was not inactive. He himself found and destroyed targets.

Ability to observe keenly, quick finding and evaluating of targets—this is the main thing in combat work of snipers. They continually follow the enemy and the actions of his units. Of two or more discovered targets, the sharpshooter chooses that which at the given moment hinders the attackers most. When the target is out of the sniper's reach, he indicates it to the artillery with tracer bullets, and himself quickly changes position after firing the tracer bullets so as not to be discovered.

Some snipers, lured on by the general forward movement, choose positions with a limited field of fire, and organize them poorly. But the sniper must see everything, even in offensive combat. This is why it is essential to make bold use of positions commanding the field of fire; trees, buildings, and turrets of wrecked tanks. Before changing position, the sniper must select the next one with good field of fire and concealed approaches.

When the enemy begins to retire, the sniper moves forward, and together with groups of tommy gunners infiltrates farther to the routes of probable retreat of the enemy. Here from ambush the sharpshooter kills officers, crews of fire elements covering the retreat, drivers of prime movers, motor vehicles, and tractors, and also horses.

Ordered to consolidate an occupied line, the sniper must at once dig in and camouflage himself so as to take active part in the repulse of enemy counterattacks.

### **Superiority of Leadership**

#### **The Work of a Branch of Service School**

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a German article by War Reporter Dietrich Friede in *Berliner Börsen-Zeitung*, Berlin, Germany, 5 August 1943.]

WAR NEVER rests, even though at times it appears to. He who fails to keep up, loses his contact, and more. The longer the duration of the war, the more imperative the demand for increased output. This applies to whatever material is required in the conduct of operations. It applies still more to the human being, for the intensification of the employment of material equipment increases the demand for trained leaders. What sufficed during the first year no longer suffices in the fourth and fifth years. The multiplication and increase in the complexity of weapons requires constant study and demands uninterrupted schooling, in order that mastery of the new equipment may not be lost.

The double demand is complied with. In the great struggle from Byelgorod to Orel, new and improved German weapons stood their battle test. The new equipment keeps pace with the war. Technically, we are not in the rear but in the lead. We give equipment its due. We make use of it, however, without bowing down to it, for intellect and the art of command are valued even more highly. Personality is of a higher order than numbers. It pays the masses in kind. The mass assault by the Bolsheviks went to pieces when opposed by individual fighting ability. On this account, while the home front concentrates on equipment, while the armies of the central front win new victories with new weapons, the young corps of commanders is constantly being educated for new and greater tasks. At the order of the Führer, budgetary appropriations have been made for army branch of service schools for young officers and officer aspirants. They are already at work. Young officers from the main line of resistance are prepared for higher command. Taught by proved leaders they continue their progress in the art of leadership.

In the Crimean fortress there has been in operation an army branch of service school for young officers and officer aspirants. In the capacity of its first commandant, there came from the Kuban bridgehead a noteworthy personality, a commander, a well-known wearer of the oak leaves. He built up the school in a very short time. He showed the first class, company and battery commanders from the bridgehead, the high and difficult laws of human leadership. He gave to them from his rich store of experience.

Education and training at the school have as their aim, the imparting of the ability to the young officers not only to command a unit of their own arm, but also a combined and larger unit comprising several arms of the service. That they have the ability to command their own unit the young commanders have proven in the marshes of the front, on the plains and in the hills of the Krymskaya area, in the mountains of Novorossisk. Now they are instructed in the higher art of commanding units of combined arms and of directing the cooperation of all arms.

Much is required. Tactical knowledge is not the only and also not the most essential thing, although tactics in and of itself and familiarity with weapons are indeed fundamental matters. They are taken for granted. How could anyone who did not have a knowledge of the various weapons, their management, their capabilities, and their limitations ever become a commander? It is the simplest prerequisite that there be no gaps in the instruction. It is broadened at the branch of service school to include arms that the various commanders have not directed before. It covers instruction in the command and employment of many arms at the same time. Up to the present, in spite of broadened instruction, every



one is dependent. Command requires more than a mastery of arms, more than classroom knowledge. It does not suffice to have learned the principles of command of arms or of the conduct of military operations. The need for massing combat equipment, for instance, is easily remembered, especially when it is taught in an unacademic manner with the original types of expression savoring of the front that come from the instructing Major. The qualifications of a commander are not to be acquired by study. They must be innate. Leadership must be native to the man. The branch of service school will awaken it and develop it. This is its instructional mission, which is greater, more important, and more difficult than its instructional task. Only the personality, the commander who is already formed and fashioned, is able to awaken and strengthen the qualities of leadership in young, developing commanders. Leadership grows by example.

The command of men is the greatest of missions. Over and above technical and tactical missions it possesses a host of mental, spiritual, moral and ethical postulates. Its greatest responsibility is found in time of war, the responsibility for the lives of many men. The quality of leadership is not to be judged alone by the goal that has been attained. The best leadership reduces sacrifices to a minimum. Let us mention a lesson that has been taught by experience and that was stated by the Major when he was making his criticism of an exercise concerning the destruction of an assumed enemy landing force: "We should not accept anything that war brings us as fate. Every commander is responsible for the lives of his soldiers and must seek to correct fate by energetic action." The opportunity for correction lies in the most accurate training, in the hardest and most complete schooling, and this the officer must demand of himself and also of every man, especially of subordinate commanders. "The platoon leaders must be so trained that every one of them will feel that the outcome of a battle depends only on his own pla-

toon." Still greater, however, are the demands on the commander himself—superior knowledge, vision, intuition, energy, the gift of being able to sweep subordinate commanders and men along with him, ever alert consciousness of his responsibility for his assignment and for the men that are under his command.

The shaping of this ability to lead is a matter of practice and instruction. The branch of service schools of the army see in this their principal task. Schooling at these army schools will guarantee us a corps of commanders for the future that will be superior to those of the enemy. The enemy has the mass. He is lacking in the personalities of the individual commanders who love responsibility, who are capable of bearing responsibility, who in every unexpected situation do the correct thing even without orders. In the lower and middle ranks of commanders, the Soviets have nothing that is anywhere near what we have in our young commanders' corps. The new educational work at the army branch of service schools for young officers and aspirant officers will increase still more the superiority of the German commander. Already in this we have a sure guarantee of the continuation of the battle.

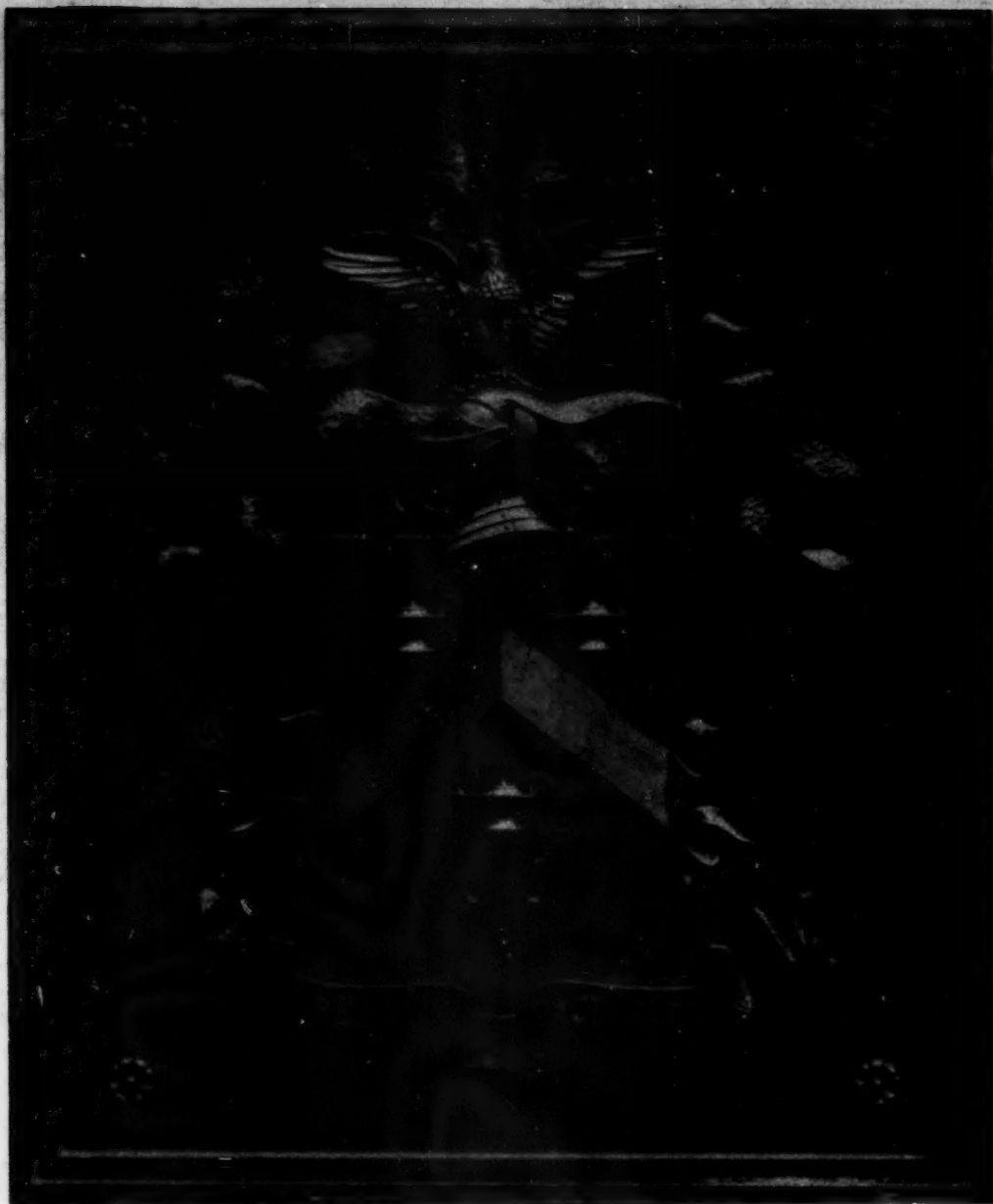
From the army school in the Crimean fortress the young officers will return to the main line of resistance at the Kuban bridgehead. The commander with the oak leaves will also have his place again, facing the enemy. But the school will continue, will accept successfully all the company and battery commanders. Nowhere is there an unproductive pause. Everything is in operation in order that the army will be continually better, the various arms still more effective. It is fitting, in view of the importance of the Crimean fortress, that the army branch of service school was established on the coast of the Crimea, in the strong bulwark of Europe that stands visibly before the eyes of the enemy after the manner of the Atlantic Wall.

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**There must be two of you to rush a house, you and a grenade. Both of you should be lightly clad, you without a haversack and the grenade without its shirt. This is how you rush a house; let the grenade go in first and then you follow. Go through the whole house in the same way; first the grenade, then yourself.**

—Lieutenant General V. I. Chuykov, Soviet  
Army, defender of Stalingrad.

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